



York County Watershed Implementation Plan

Working Together for Clean Water



YORK COUNTY
WATERSHED IMPLEMENTATION PLAN

AUGUST 2013

Prepared By:
York County Coalition for Clean Waters

Endorsed By:
York County Board of Commissioners
September 4, 2013

Sponsorship of Copy for each Municipality By:
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York County Planning Commission

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Susan	Miller	Miller & Sons, Inc. (Septic Pumping Business)
Skip	Missimer	Red Lion Municipal Authority
Gary	Peacock	York Co. Conservation District
Jake	Romig	York Co. Circuit Rider
Chris	Ryder	Stock & Leader
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Pam	Shellenberger	York Co. Planning Commission
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Robert	Steele	York Township (Commissioner)
Byron	Trout	GLB Associates
Andy	Zemba	PA DEP

RESOLUTION 2013-14

**RESOLUTION ENDORSING THE YORK COUNTY
WATERSHED IMPLEMENTATION PLAN**

WHEREAS, the Clean Water Act required the U.S. Environmental Protection Agency (EPA) to set limits on the amount of pollutants, known as Total Maximum Daily Loads (TMDLs), that can enter the Chesapeake Bay; and

WHEREAS, EPA required Bay states, including Pennsylvania, to develop Watershed Implementation Plans (WIPs) that will lead to the restoration of the Chesapeake Bay and clean local streams; and

WHEREAS, Pennsylvania has developed a Chesapeake Bay WIP, which sets forth a strategy for the Commonwealth to achieve the required pollutant reductions mandated by the TMDL; and

WHEREAS, the Pennsylvania WIP includes draft pollution reduction targets for each county in the Chesapeake Bay Watershed to serve as a guide for local water quality improvement efforts; and

WHEREAS, York County is one of the counties located in the Chesapeake Bay Watershed; and

WHEREAS, the York County Coalition for Clean Waters has prepared a York County WIP that sets forth a strategy to meet the County's draft nutrient and sediment reduction targets and likewise clean up impaired waters in the County; and

WHEREAS, the York County Board of Commissioners believes that clean waters are important to the health and quality of life for its residents; and

WHEREAS, the York County Board of Commissioners has reviewed the *York County Watershed Implementation Plan: Working Together for Clean Water* and supports the solutions and strategies set forth in the Plan to clean up the County's impaired waters and protect our streams, rivers and the Chesapeake Bay;

NOW, THEREFORE BE IT RESOLVED that the York County Board of Commissioners hereby endorses the *York County Watershed Implementation Plan* as a tool to improve the County's impaired waters and the Chesapeake Bay and affirms the York County Coalition for Clean Waters as the lead advocate for its implementation.

Approved and Adopted this 4th day of September, 2013

ATTEST:



Charles R. Noll
Administrator/Chief Clerk

YORK COUNTY BOARD OF COMMISSIONERS



Steve Chronister, President



Doug Hoke, Vice President



Christopher B. Reilly, Commissioner

“The good life of any river may depend on the perception of its music; and the preservation of some music to perceive.”

— [Aldo Leopold](#)



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**Local Citizen Group volunteers to
plant a riparian buffer**

Preface

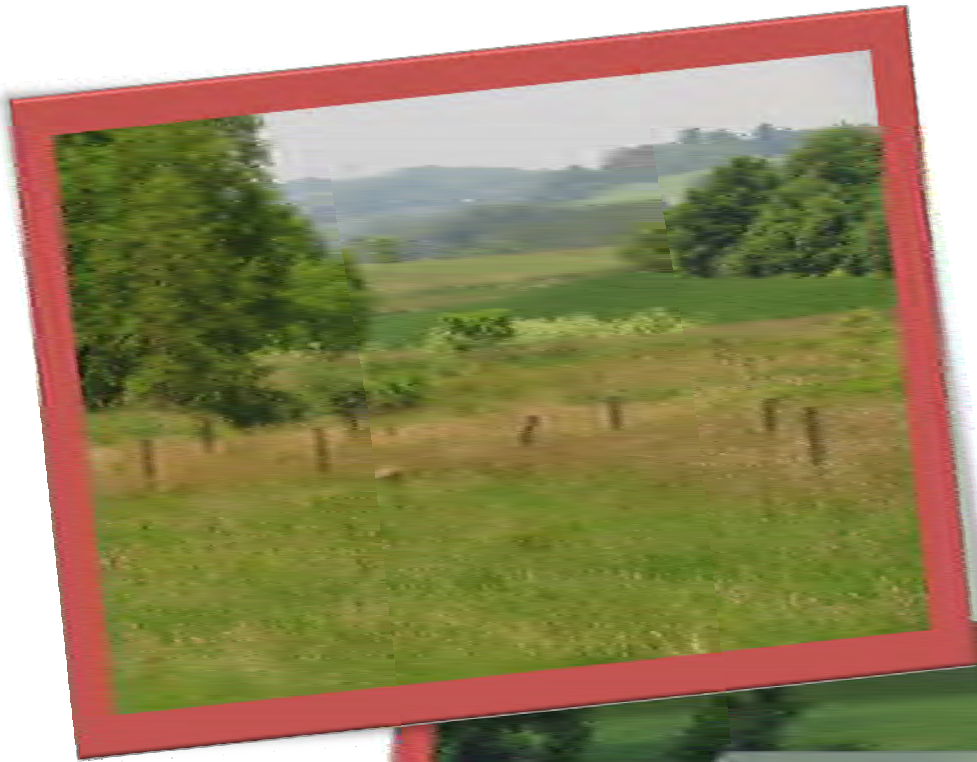
The purpose of this Plan is to provide a strategy by which York County can best accomplish progress towards improving its waters and meeting the draft pollutant reduction targets established in the Pennsylvania Chesapeake Bay Watershed Implementation Plan (PA WIP). The PA WIP was developed by the Pennsylvania Department of Environmental Protection (PA DEP) and is the State's strategy to reduce its required allocation of the Chesapeake Bay pollutants identified in the Chesapeake Bay Total Maximum Daily Load (TMDL). More simply stated, York County waters have problems that contribute to the pollution of the Bay and, therefore, need to be fixed.

Now is the time to begin fixing these problems and clearly demonstrating to PA DEP that York County, including municipalities and residents, is doing its part to clean up impaired waters and reduce the pollutant load to the Bay. This would be extremely beneficial to the County, as a whole; because lack of progress could result in the U.S. Environmental Protection Agency (US EPA) telling the County exactly what must be done to fix the streams. The process of Federal involvement has already begun as evidenced through the mandated Municipal Separate Storm Sewer System (MS4) permitting program.

It is vital that this Plan establish a strategy that reveals to every York County municipality the problem, how to best fix the problem, the ramifications of mandatory requirements imposed upon municipalities and their residents should the problem not be fixed, and the benefits from municipal cooperation on a countywide basis, such as more effective solutions and less expense. The strategy targets municipalities as the conduit to implement the strategy because they have the best understanding of local issues, can best effect land use changes, and are best equipped to educate, inform, involve, motivate, and reach out to individual stakeholders.

Cooperation, collaboration, and partnerships will be an important component of carrying out the strategy. This includes, but is not limited to, engaging citizens, environmental organizations, non-profit groups, and public/private foundations. Often times, these groups will gladly volunteer to support local initiatives that restore and protect local waters when they understand the threats to those waters. Additionally, financial resources and technical assistance will likely be needed.

This Plan intentionally does not repeat the abundant information found in other studies/plans, such as the PA WIP, PA DEP Best Management Practices (BMP) Manual, and York County Integrated Water Resources Plan (IWRP), and it is not meant to educate the general public. Its primary purpose is to inform municipalities of the problem, describe and prioritize potential solutions, provide a tool to help municipalities start information, action, and cooperation flowing to and out of their stakeholders, and result in cost savings to municipalities and residents.



**Riparian Buffer on
York County Farm**



Section I. Introduction

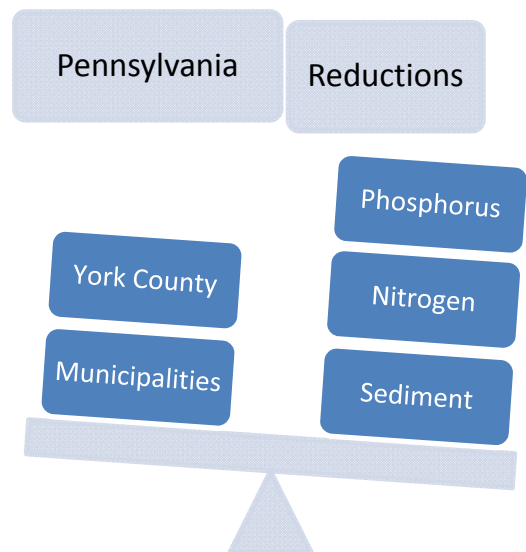
Background

York County is located on the west side of the Susquehanna River, which supplies roughly 50% of the water to the Chesapeake Bay. The Chesapeake Bay water quality has degraded to a poor condition and, despite extensive restoration efforts, the poor water quality has continued. This necessitated the U.S. Environmental Protection Agency (US EPA) to establish a “pollution diet” for the Bay, called a Total Maximum Daily Load (TMDL). The pollution diet, or TMDL, identifies pollutant reductions from major sources of nitrogen, phosphorus and sediment that are needed to restore the Bay and sets pollution limits to meet water quality standards established for the Bay and its tidal rivers. The pollution limits are now mandates for the states within the Chesapeake Bay Watershed to achieve.

Pennsylvania has developed a Chesapeake Bay Watershed Implementation Plan (WIP), which sets forth a strategy for the Commonwealth to achieve the required pollutant reductions mandated by the TMDL. This involves finite reductions in nutrients (nitrogen and phosphorus), as well as sediment. The Pennsylvania WIP is significant in two (2) aspects as far as York County is concerned. First, it describes the process by which the required pollution reductions will be achieved through compliance with existing regulations, new technology, nutrient trading, and monitoring/tracking pollution reduction measures implemented. Secondly, the State openly acknowledges that success of the WIP implementation depends largely upon local municipalities being actively engaged with their citizenry.

The Chesapeake Bay TMDL is unique for Pennsylvania in the sense that the legal requirement for pollution reductions falls upon the State, while land use authority, which enables the practices and the construction of structures required to reduce pollution, is delegated to local municipalities. The State WIP acknowledges that voluntary actions, along with permit requirements of municipal/county governments, will be required to achieve the mandated pollutant reductions.

Pennsylvania has taken its total pollution reduction requirement and divided it among the counties in the Chesapeake Bay watershed to identify draft county targets. These draft targets are intended to be a guide for local water quality improvement efforts, with the goal being that if each county reaches its draft targets, the State will



achieve its TMDL allocation requirements. In other words, these draft targets give counties an idea of their piece of the State's pollutant reduction goal.

The US EPA has made it very clear in the TMDL, and Pennsylvania has acknowledged in its WIP, that there will be consequences should Pennsylvania not make significant progress and/or achieve its required reductions. These consequences may include US EPA using its authority to implement stricter permit limits, broaden definitions of entities requiring permits (MS4s and CAFOs), and increase monitoring/oversight. Municipalities, especially non-MS4 municipalities, need to be aware that should sufficient progress not be made, non-MS4 municipalities in York County could become required to comply with MS4 municipal obligations, which include requiring an NPDES permit. Definitions for agricultural operations requiring permits could be expanded as well. It is also perceivable that stricter permit limits could be established, thereby requiring additional sewage treatment plant upgrades, which could result in higher rates for customers. It is important that all York County municipalities understand the obligations, costs, work, and consequences associated with holding an MS4 NPDES Permit. Voluntary actions could well save already limited resources and improve water conditions.

All the background information along with explanations of all existing requirements and programs, referred to above, are included in the Chesapeake Bay TMDL and /or the Pennsylvania WIP. The main objective of this part of the York County Watershed Implementation Plan (WIP) is to convey four (4) key points:

1. The Chesapeake Bay is polluted with nutrients and sediment;
2. The Federal Government (US EPA) has told Pennsylvania that it needs to reduce pollution by a specified amount;
3. Pennsylvania has developed a Plan documenting how the State will meet its mandate, which includes voluntary actions by local entities, ensuring compliance with existing regulations, and increasing monitoring/reporting of pollution reduction efforts/structures; and
4. If the required pollutant reductions are not met as measured every two (2) years, the US EPA will take action to ensure the reductions happen. These actions will result in increased permitting under US EPA's authority.

Purpose/Goals

The intent of the York County WIP is to develop a strategy by which York County can best meet its identified draft pollutant reduction targets and likewise clean up impaired streams in the County. It is believed that local people can best figure out how to achieve these reductions, thereby averting the possibility of the State or Federal Government telling the County and its municipalities what needs to be done. Efficiency, fewer mandates, and increased local input will achieve better results. Another benefit of this effort will be a foundation by which municipalities can meet MS4 Chesapeake Bay pollutant reductions required by their MS4 NPDES permits. Thus, this Plan is starting to

build what is already a requirement for the 43 MS4 municipalities in York County, a Chesapeake Bay Pollutant Reduction Plan. Hopefully, York County's WIP will accomplish a large part of this requirement for the MS4 municipalities, while helping to prevent the non-MS4 municipalities from needing to meet this requirement.

The York County WIP establishes a logical process for reducing pollutants. By asking the following questions, dialog between different individuals and agencies is initiated, encouraging them to work together to come up with viable solutions.

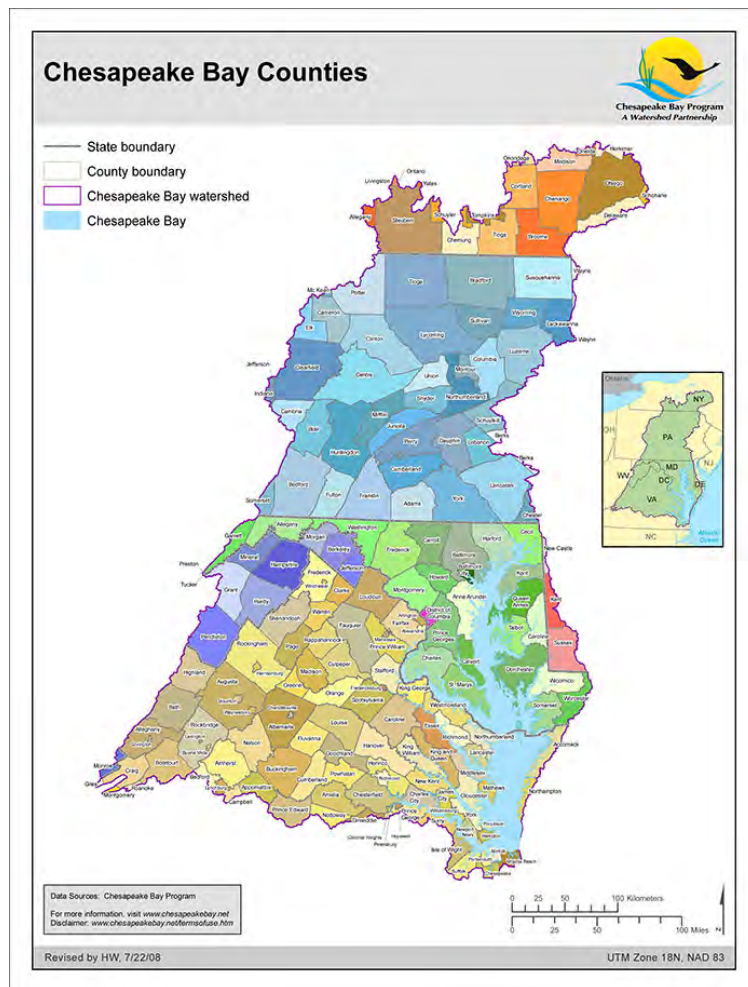
What needs to be cleaned up?	
Where are the clean up areas located?	
How can the most reduction for the least amount of cost be achieved?	
How and when should the clean up begin?	
How should accomplishments be recorded and monitored?	

A York County property recognized for their efforts in protecting the water



Section II. Identify York County Targets

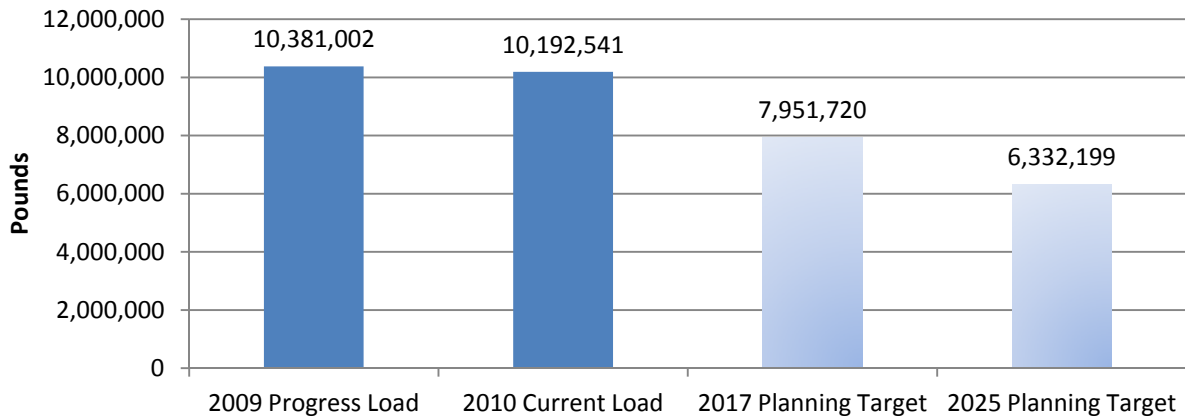
How much pollution needs to be cleaned up by York County? The Pennsylvania Department of Environmental Protection (PA DEP) has distributed pollutant reduction targets to each county in the Chesapeake Bay Watershed, including York County. Along with pollutant reduction numbers, a scenario by which York County could achieve these reductions through the establishment/construction of identified Best Management Practices (BMPs) was provided. Based on input from several local stakeholders with expertise in implementing agricultural, urban and other BMPs, the scenario provided with the Draft Targets would be difficult for the County to achieve. Thus, this Watershed Implementation Plan will establish another scenario that the York County Coalition for Clean Waters believes is the most efficient/practicable for York County to implement.



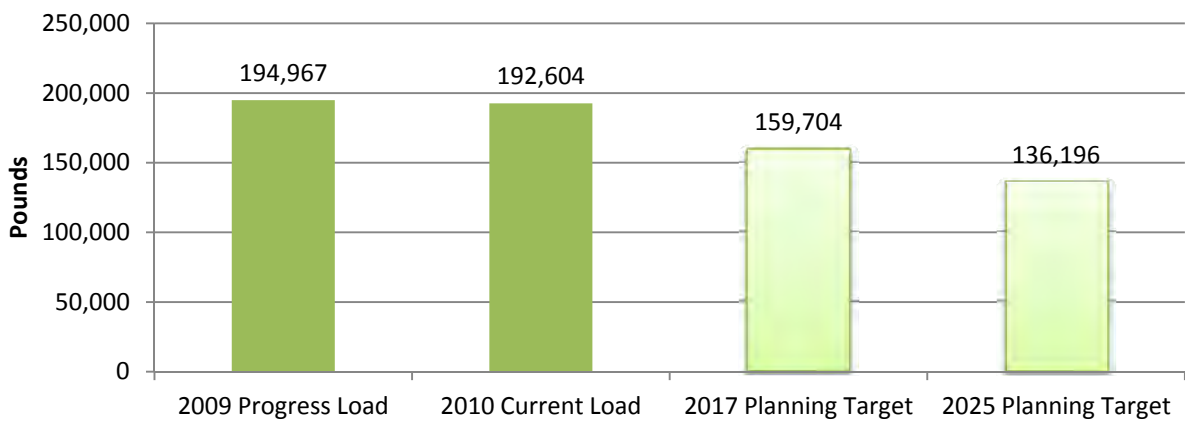
York County's draft planning targets are depicted in the bar graphs on the following page. Present pollutant loads of County waters are illustrated, along with estimated pollutant loads needed to be achieved. The first bar on the graphs shows how many pounds of Nitrogen, Phosphorus, or Sediment were estimated as being present in York County waters in 2009. The second bar illustrates the 2010 load, which indicates that some progress was made in reducing the loads of pollution to our waters from 2009-2010. The third bar is a progress goal for the County to attain in order to stay on track to meet the 2025 planning target. The final bar is the County's target load to achieve by 2025. For Nitrogen and Sediment, this number is about a 39% reduction from 2009; while, for Phosphorus, it's about a 30% reduction. For the full York

County draft planning targets as generated by PA DEP, see Appendix A.

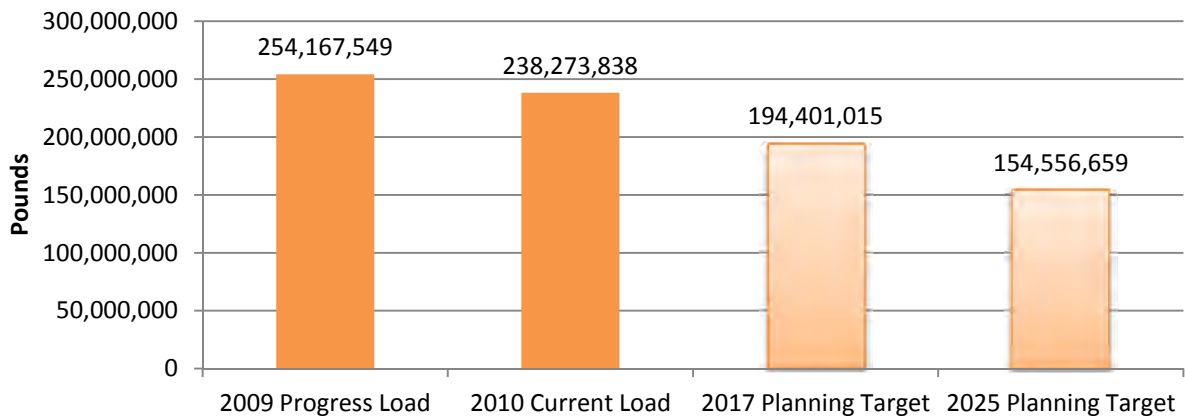
York County Nitrogen Planning Target



York County Phosphorus Planning Target



York County Sediment Planning Target



Section III.

Where Does York County Need to Reduce Nutrients and Sediment?

PA DEP's Integrated Water Quality Monitoring and Assessment Report lists the polluted streams and the reasons for the pollution. Additionally, the Report identifies waters that have a developed total maximum daily load (TMDL) and waters that require a TMDL, including a target date for the development of the required TMDL. For this section of the York County WIP, the Integrated Water Quality Monitoring and Assessment Report is used to identify York County impaired waters, the pollutants that caused the impairments, and the source of the impairments. Likewise, the Report can be used to identify York County waters that need reductions in nutrients (nitrogen/phosphorus) and/or sediment to improve water quality.

The 2011 York County Integrated Water Resources Plan (IWRP) included information on **all** York County impaired waters from the PA DEP's Water Quality Monitoring and Assessment Report. This Plan, however, focuses on the waters impaired by nutrients and/or sediment (see Map 1 and Appendix B). Map 1 also shows the York County large watersheds and municipal boundaries, in order to put the impaired waters in perspective. Map 2 shows the impaired sub-watersheds within each of the larger watersheds, which further demonstrates the extent of nutrient/sediment impairment in the County.

According to the 2012 Report, the impairment of 28% of the waters shown is due solely to an agricultural source and the cause in each case is siltation. Approximately 50% of the waters are impaired due to another source or sources in combination with agriculture, with urban runoff/storm sewers being the most prevalent. It is also interesting to note that siltation is a contributing cause of the impairment in 93% of the waters and it is the sole cause in 53% of the waters.

A listing of York County waters that are impaired to some extent due to nutrients and/or sediment can be found in Appendix B. Also included are the impaired use, source and specific cause for each water body listed.

It is essential to remember that US EPA's, and therefore PA DEP's, watershed restoration priorities are developed and implemented as a result of the Integrated Water Quality Monitoring and Assessment Report. Thus, this Report should be used as a tool to identify priority locations for watershed restoration projects in York County.



“Ethical behavior is doing the right thing when no one else is watching – even when doing the wrong thing is legal.”

— [Aldo Leopold](#)

**What's in your
stormwater?**



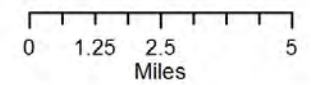
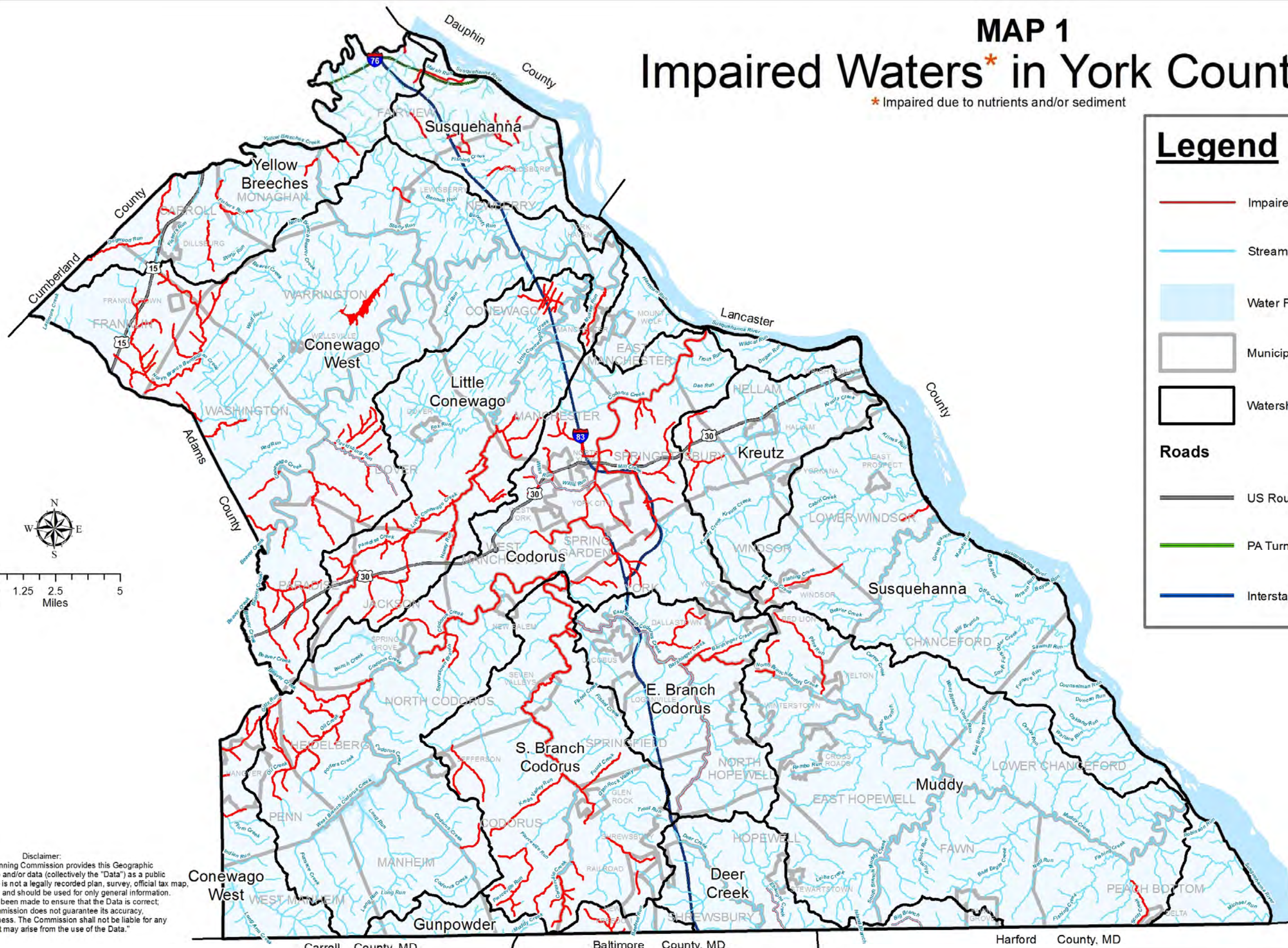


MAP 1 Impaired Waters* in York County, PA

* Impaired due to nutrients and/or sediment

Legend

-  Impaired Water*
 -  Stream
 -  Water Feature
 -  Municipal Boundary
 -  Watershed Boundary
- Roads**
-  US Route
 -  PA Turnpike
 -  Interstate



Disclaimer:
The York County Planning Commission provides this Geographic Information System map and/or data (collectively the "Data") as a public information service. The Data is not a legally recorded plan, survey, official tax map, or engineering schematic and should be used for only general information. Reasonable effort has been made to ensure that the Data is correct, however the Commission does not guarantee its accuracy, completeness, or timeliness. The Commission shall not be liable for any damages that may arise from the use of the Data."

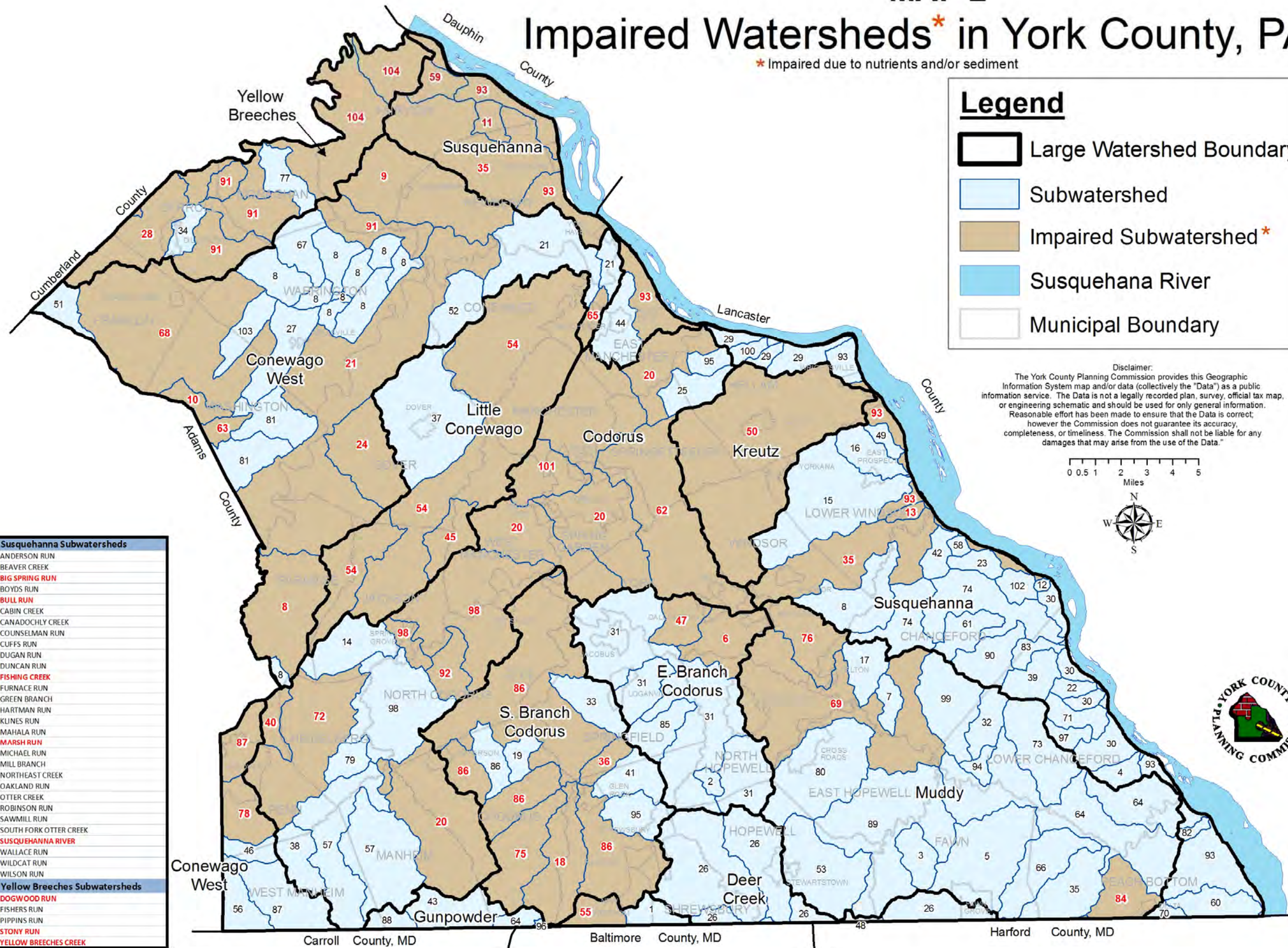
Bolded Watersheds Impaired

Impaired Watersheds* in York County, PA

* Impaired due to nutrients and/or sediment

Codorus Subwatersheds	
14	BUNCH CREEK
20	CODORUS CREEK
25	DEE RUN
38	FURNACE CREEK
40	GITTS RUN
57	LONG RUN
62	MILL CREEK
72	OIL CREEK
79	PORTERS CREEK
92	STOVERSTOWN BRANCH
95	TROUT RUN
98	WEST BRANCH CODORUS CREEK
101	WILLIS RUN
Conewago West Subwatersheds	
8	BEAVER CREEK
9	BENNETT RUN
10	BERMUDIAN CREEK
21	CONEWAGO CREEK
24	DAVIDSBURG RUN
27	DOE RUN
46	INDIAN RUN
51	LATIMORE CREEK
52	LAUREL RUN
56	LONG ARM CREEK
63	MUD RUN
65	MUSSER RUN
67	NORTH BRANCH BEAVER CREEK
68	NORTH BRANCH BERMUDIAN CREEK
78	PLUM CREEK
81	RED RUN
87	SOUTH BRANCH CONEWAGO CREEK
91	STONY RUN
103	WOLF RUN
Deer Creek Subwatersheds	
26	DEER CREEK
48	ISLAND BRANCH
East Branch Codorus Subwatersheds	
2	"REHMEYER HOLLOW"
6	BARSHINGER CREEK
31	EAST BRANCH CODORUS CREEK
47	INNERS CREEK
85	SEAKS RUN
Gunpowder Subwatersheds	
1	BEETREE RUN
43	GUNPOWDER FALLS
55	LITTLE FALLS
64	MUDDY CREEK
88	SOUTH BRANCH GUNPOWDER FALLS
96	WALKER RUN
Kreutz Creek Subwatershed	
50	KREUTZ CREEK
Little Conewago Subwatersheds	
37	FOX RUN
45	HONEY RUN
54	LITTLE CONEWAGO CREEK
Muddy Subwatersheds	
3	ALUM ROCK RUN
5	BALD EAGLE CREEK
7	BEAR BRANCH
17	CARTER CREEK
32	EAST BRANCH TOMS RUN
35	FISHING CREEK
53	LEIBS CREEK
64	MUDDY CREEK
66	NEILL RUN
69	NORTH BRANCH MUDDY CREEK
73	ORSON RUN
76	PINE RUN
80	RAMBO RUN
84	SCOTT CREEK
89	SOUTH BRANCH MUDDY CREEK
94	TOMS RUN
99	WEST BRANCH TOMS RUN
South Branch Codorus Subwatersheds	
18	CENTERVILLE CREEK
19	CHERRY RUN
33	FISHEL CREEK
86	FOUST CREEK
41	GLEN ROCK VALLEY
75	PIERCEVILLE RUN
86	SOUTH BRANCH CODORUS CREEK
87	SOUTH BRANCH CONEWAGO CREEK
95	TROUT RUN
Susquehanna Subwatersheds	
4	ANDERSON RUN
8	BEAVER CREEK
11	BIG SPRING RUN
12	BOYDS RUN
13	BULL RUN
15	CABIN CREEK
16	CANADOCHLY CREEK
22	COUNSELMAN RUN
23	CUFFS RUN
29	DUGAN RUN
30	DUNCAN RUN
35	FISHING CREEK
39	FURNACE RUN
42	GREEN BRANCH
44	HARTMAN RUN
49	KLINES RUN
58	MAHALA RUN
59	MARSH RUN
60	MICHAEL RUN
61	MILL BRANCH
70	NORTHEAST CREEK
71	OAKLAND RUN
74	OTTER CREEK
82	ROBINSON RUN
83	SAWMILL RUN
90	SOUTH FORK OTTER CREEK
93	SUSQUEHANNA RIVER
97	WALLACE RUN
100	WILDCAT RUN
102	WILSON RUN
Yellow Breeches Subwatersheds	
28	DOGWOOD RUN
34	FISHERS RUN
77	PIPPINS RUN
91	STONY RUN
104	YELLOW BREECHES CREEK

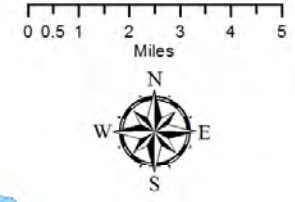
Susquehanna Subwatersheds	
4	ANDERSON RUN
8	BEAVER CREEK
11	BIG SPRING RUN
12	BOYDS RUN
13	BULL RUN
15	CABIN CREEK
16	CANADOCHLY CREEK
22	COUNSELMAN RUN
23	CUFFS RUN
29	DUGAN RUN
30	DUNCAN RUN
35	FISHING CREEK
39	FURNACE RUN
42	GREEN BRANCH
44	HARTMAN RUN
49	KLINES RUN
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59	MARSH RUN
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70	NORTHEAST CREEK
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Yellow Breeches Subwatersheds	
28	DOGWOOD RUN
34	FISHERS RUN
77	PIPPINS RUN
91	STONY RUN
104	YELLOW BREECHES CREEK



Legend

- Large Watershed Boundary
- Subwatershed
- Impaired Subwatershed*
- Susquehanna River
- Municipal Boundary

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Section IV. Ways to Achieve and Account for Pollution Reductions

There are many ways to achieve and account for pollution reductions. In developing an effective and viable strategy for York County to meet its pollution reduction targets, a variety of solutions were evaluated. Below is a description of potential solutions recommended for the County by the York County Coalition for Clean Waters.

Capture Unreported Actions

The Chesapeake Bay Model can only give credit for BMPs entered into it, and only what is known can be entered into it. The amount of pollution reduction Pennsylvania has achieved since January 1, 2006, is determined by BMPs that have been entered into the Bay Model by US EPA. To date, Pennsylvania has primarily included only BMPs cost shared by Federal/State programs. Thus, unreported actions relate to BMPs that were (1) funded completely by private dollars, (2) cost shared through government programs not presently accounted for in the Bay Model, or (3) undertaken without pollution reduction being a goal, but in reality, achieved pollution reductions.

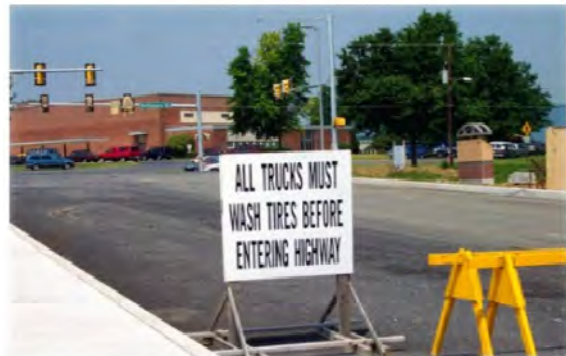
Appendix C lists the Federal/State programs that capture BMPs included in the Bay Model, while Appendix D contains a description of each recommended pollution reduction action for York County. The descriptions are categorized under Agricultural BMPs and Urban BMPs, all of which are recognized in the Bay Model. A review of these lists indicates that there is real potential for projects to have been completed, but not included in the Bay Model. Therefore, it could be very advantageous for municipalities to identify BMPs that were completed since January 1, 2006, but have not been submitted for inclusion in the Bay Model.

York County's municipalities need to identify, report, and get credit for these unreported BMPs to help achieve their draft target reductions. These unreported BMPs, or "credits," may be the least costly and most efficient means of reducing the distance the County must travel toward reaching its pollutant reduction targets. Examples of such projects include, but are not limited to:

- Ag BMPs not associated with conservation plans and/or cost shared by Appendix C programs,
- Municipal BMPs not required by NPDES permits or cost shared by Appendix C programs,
- Projects cost shared with agencies not included in Appendix C, such as PEMA and PennDOT; project examples include Wrightsville Susquehanna riverbank restoration and PennDOT Mt. Rose Avenue stream bank stabilization,
- Projects requiring PA DEP permits, BUT not cost shared by Appendix C programs,
- Erosion and sedimentation projects not reported to PA DEP, and
- BMPs completed by any stakeholder on private lands.

With regard to submitting unreported actions for inclusion in the Bay Model, it is crucial that the data collected ultimately be acceptable to US EPA. Guidance, to assist with data collection, is currently under development by US EPA and the Chesapeake Bay Program. According to PA DEP, it will accept data for all unreported projects, however, it is preferred that the collected data be provided to the York County Conservation District (YCCD) for review and submission. Per PA DEP's agreement with US EPA, the YCCD is authorized to submit projects for inclusion in the Bay Model.

Nevertheless, it is important to understand that if it were achievable to catalogue and verify enough unreported BMPs, completed since January 1, 2006, for York County to achieve its reduction targets, continued implementation of the plans and strategies already developed throughout the County would still be necessary.



In addition to figuring out what York County already has on the ground that hasn't been included in the Model, a method to capture future "unreported" projects needs to be developed. Projects not captured by PA DEP cost sharing, often need land use reviews, permit reviews and or planning comments by multiple State, county, and local agencies. Project data could be easily captured at the time of review and submitted to PA DEP for consideration toward Chesapeake Bay TMDL pollutant reductions. Nevertheless, coordination between multiple agencies and communication with PA DEP would be required in order for projects to find their way into the Bay Model.

Existing Program Administration

Administration of existing programs, which includes regulatory compliance and subsequent enforcement, will help York County move closer toward meeting its pollutant reduction targets. The need for assistance with compliance from State and Federal partners is an important component of this solution. Three (3) aspects of program administration are considered in this Plan.

The first is compliance required under the NPDES Permit Program; conditions associated with permits must be met. The Nutrient Credit Trading Program is an option by which permit compliance may be possible. The PA DEP created a Nutrient Credit Trading Program, enabling an eligible permit holder to buy pollution reduction credits from another entity, who has either (a) generated credits by reducing pollutants more than is required by law; (b) has not discharged its allocation of pollution into the watershed; or (c) has installed an improvement that results in quantifiable pollution reductions. So, buyers and sellers should be aware of what credits are actually available for sale (must be credits 'certified' by PA DEP). Like any other regulatory program, the Pennsylvania Trading Program is revised periodically.

The regulatory acceptance of nutrient credit trading, coupled with the possible financial benefits, makes nutrient credit trading an approach to consider and analyze as a component of York County's pollutant reduction strategy. It is important to remember that the financial benefits of this Program could be a savings realized for the purchaser of credits, as well as an income producer for the seller of credits. Furthermore, these financial benefits could result in more funds being available to implement additional BMPs.

A second aspect deals with Conservation Plans, Nutrient Management Plans, and Manure Management Programs. Although municipalities are not responsible for compliance under these Programs, benefits of complying with the associated regulations may well have positive impacts for municipalities. There are various reasons why countywide compliance with Conservation Plan requirements has not been achieved, but limited resources are most likely a primary cause. The YCCD works with farmers to develop and implement Conservation Plans that address not only the conservation plan requirements, but also nutrient and manure management regulations. The limited resources of the YCCD have resulted in a backlog of Conservation Plans in need of development, review and/or approval. A potential consideration worth analysis for this Plan could be obtaining municipal assistance in hiring independent technicians to work with YCCD to administer the Program and attain compliance. Should the analysis prove the benefits (pollution reductions) would keep stricter MS4 requirements away from municipalities, they could achieve some cost savings.

A third aspect is the administration of stormwater management (SWM) regulations under the Pennsylvania Stormwater Management Act (Act 167). This task falls to each County municipality who is required, by the Act, to adopt a SWM Ordinance consistent with the County's approved and adopted countywide SWM Plan. This requirement, to

date, has not been fulfilled by all County municipalities, although most, if not all, are working in that direction. Compliance with Act 167, and subsequent enforcement of the adopted SWM Ordinances, will help prevent urban stormwater runoff pollution from getting worse, thereby allowing the benefits of BMPs installed outside of Act 167 to have a greater impact toward achieving the target reductions.

Best Management Practices (BMPs)

Best Management Practice (BMP) solutions consist of two (2) general types: structural BMPs and non-structural BMPs. Both types will need to be an integral component of York County's Watershed Implementation Plan (WIP) strategy. Moreover, the sustainability of York County's water resources will depend upon incorporating BMPs into all aspects of our communities and lives. The Pennsylvania Stormwater BMP Manual identifies and describes both structural and non-structural BMPs and, in addition, provides design/construction criteria for structural BMPs. Nevertheless, a brief overview of each type is provided below.

Non-structural BMPs: Non-structural BMPs are practices that incorporate techniques and behaviors that do not involve physical construction. Education, outreach, planning, ordinance provisions, and land preservation are types of non-structural BMPs. A municipal ordinance restricting diesel engine idling is an example of a non-structural BMP for which credit may be given by US EPA.

As noted above, there are many types of non-structural BMPs. This WIP, however, will focus on provisions that could be adopted by a municipality, either through a standalone ordinance or incorporated into an existing zoning or subdivision/land development ordinance, and, when put into practice, would ultimately help to reduce stream pollution. These provisions include, but are not limited to, the following:

- Urban Nutrient Management - Urban nutrient management involves applying the recommended rate of fertilizer to grass lawns and other urban areas. The implementation of urban nutrient management is typically based on public education and awareness, targeting suburban residences and businesses, with emphasis on reducing excessive fertilizer use. However, consideration could also be given to adopting an ordinance to regulate the application of lawn fertilizers.
- Conservation by Design/Low Impact Development (LID) - Conservation by Design incorporates natural features of a site into the planning and development process. This process utilizes and attempts to mimic the natural hydrology of a site through minimizing site disturbance and the use of LID techniques. LID allows for greater development potential with less environmental impacts and generally refers to those construction techniques which result in post-construction hydrology imitating pre-construction hydrology (ex. tree conservation, landscaping/buffers, on-lot bioretention, reduced setbacks, and disconnected downspouts). Together,

Conservation by Design and LID achieve a better balance between conservation, growth, ecosystem protection, and quality of life.

- Green Infrastructure - Green Infrastructure is a term which generally refers to the use of natural vegetation and processes to manage stormwater runoff. Pervious pavement allowing for natural infiltration, green roofs, urban trees and rain gardens are examples of green infrastructure that help to manage stormwater. The natural processes incorporated by green infrastructure are groundwater infiltration and evapo-transpiration, both of which will reduce runoff and assimilate pollutants. (Green infrastructure is a component of Low Impact Development.)
- IWRP Flowchart Tool - The Flowchart Tool contained in the Integrated Water Resources Plan component of the York County Comprehensive Plan is a tool that integrates stormwater management into the larger water resources management process. Incorporation of the tool into municipal project/permitting requirements would address the goals of the York County WIP.
- On-lot Septic System Management - Proper operation of on-lot septic systems is critical for the protection of water resources. Municipalities which ensure on-lot septic systems are properly located, constructed, and maintained will contribute to the reduction of nutrients in County waters.
- Protection of Sensitive Environmental Areas - Sensitive environmental areas serve important purposes, many of which can reduce the pollutants identified by York County's WIP. Protecting steep slopes, riparian buffers, wetlands, woodlands and prime soils can be accomplished through various types of municipal efforts.

Structural BMPs: Structural BMPs are those practices that use physical structures/features to improve water quality. Structural BMPs can be further categorized by the types of structures and/or the location of the problem they are to address, such as urban BMPs, agricultural BMPs, infiltration BMPs, etc. A list of structural BMPs, or "Pollution Reduction Actions" recommended by the York County Coalition for Clean Waters, is provided in Appendix E.

Although PA DEP provided the County with a scenario of pollution reduction actions (BMPs) to meet the Draft Planning Targets, a primary purpose of this Plan, as previously stated, is to modify that scenario in an effort to make it better suited to York County, yet still meet the targets. An equally important purpose of this Plan is to develop an Actions Opportunity Table that would link the BMPs included in the Recommended Pollutant Reduction Actions Scenario to the impaired streams by municipality.

The Recommended Pollutant Reduction Actions Scenario Table (see Appendix D) includes an array of urban and agricultural BMPs to improve streams throughout the County, regardless of whether they are on the Impaired Waters List (see Appendix B), in an effort to be of benefit to both MS4 and non-MS4 municipalities. It also lists the

average efficiency and median life cycle cost for each BMP as it relates to nitrogen, phosphorus, and sediment, as well as the overall median life cycle cost. These figures are intended to provide guidance for municipalities, property owners and other stakeholders in their thought process with regard to BMP selection. Actual efficiencies and costs may be higher or lower. Additionally, a description of the BMPs included in the Table is provided in Appendix D.

Furthermore, **BMPs that yield the most efficiency for the least amount of cost or “biggest bang for the buck” are highlighted on the Table.** From a comparison standpoint, the agricultural BMPs result in greater pollutant reductions for the least amount of cost. According to the York County Conservation District, many of the agricultural BMPs will be carried out through implementation of approved Conservation Plans, which will help the County to meet its Draft Planning Targets and, likewise, help Pennsylvania, to meet its target allocations. Thus, for municipalities, the agricultural BMP with the “biggest bang for the buck” would be non-urban stream restoration. This type of BMP project would also be of key interest to non-MS4 municipalities in an effort to prevent US EPA backstops, such as including them in the MS4 regulatory program.



With regard to recommended urban BMPs, four (4) of the BMPs are highlighted for having high efficiency and low cost in achieving reductions in two (2) out of the three (3) pollutants. These BMPs include erosion and sediment control on construction land, erosion and sediment control on extractive (mining, quarrying) land, forest harvest practices, and urban stream restoration. The remaining urban BMPs only have high

efficiency and low cost related to a single pollutant.

The Actions Opportunity Table (see Appendix E) notes the impaired streams by municipality and the amount of land available in the watershed to implement the Recommended Pollutant Reduction Actions or BMPs. However, this Table notes potential/targeted BMP categories for simplicity; the recommended specific BMPs in each category are included on the Recommended Pollutant Reduction Actions Scenario Table (see Appendix D). For ease of use, the Actions Opportunity BMP categories are included on the Recommended Pollution Reduction Actions Scenario Table. *It is important to note that not all municipalities “house” impaired waters and not all municipalities “house” the most effective pollution reducing acres of the impaired waters.*

Both the Recommended Pollutant Reduction Actions and Actions Opportunity Tables were developed by local stakeholders, with specialized knowledge. They represent an attempt to produce a more efficient, less expensive, and more “implementable” means for York County and its municipalities to meet the Draft Planning Targets. However, the average efficiency, median lifecycle costs, and impaired waterway BMP lineal

feet/acreage calculations should be used for general information and planning purposes only. Their accuracy cannot be guaranteed as there are many variables and costs are constantly changing.

The Tables can be used separately or in conjunction with one another. While all of the BMPs listed in the Recommended Actions Table are beneficial, their applicability on a watershed or municipal basis may vary. To use the Tables together, the following steps are suggested:

1. Beginning with the Actions Opportunity Table (Appendix E), find your municipality in column 3. [Note: If your municipality is not listed, then it has no waters included on Pennsylvania's 2012 "Impaired Waters" List that are impaired due to nutrients/sediment (see Appendix B). However, the Recommended Pollutant Reduction Actions Table (see Appendix D) can be used to select and implement BMPs on streams in your municipality or, better yet, to implement a regional project, in an effort to prevent such streams from becoming a "listed impaired water" in the future.]
2. Find the impaired waters in your municipality (column 2).
3. Check to see if other municipalities have the same impaired waters. Map 1 can also be used to identify other municipalities with the same impaired waters. [Note: Regional projects are highly recommended & typically receive more favorable recognition for grant funding.]
4. Review the Potential/Targeted Urban and Agricultural BMPs for each of the impaired streams.
5. Examine the potential acreage or lineal feet available in the impaired watershed for implementing each BMP category.
6. Using local knowledge of the area, combined with the opportunities for implementation listed under each BMP category; choose the impaired waterway and the BMP category that would be most appropriate to clean up the watershed.
7. Next, use the Recommended Pollutant Reduction Actions Table (see Appendix D) to determine which specific BMP for the selected category would be most efficient in

For example, look at the first row on the Actions Opportunity Table (Appendix E). Carroll Township has 247 potential acres in the Dogwood Run Watershed to implement Urban Woodland Management (U-3) BMPs. In addition, Franklin Township has 116 and Dillsburg Borough has 12 potential acres in this Watershed to implement U-3 BMPs.

Next, using the Recommended Pollutant Reduction Actions Table (Appendix D), it indicates that there is only one type of U-3 BMP recommended, which is "Forest Harvest Practices." This is a "biggest bang for the buck" BMP, thus it would be a good

structural BMP for the three (3) municipalities to carry out together. A regional project would likely clean up more pollutants and be more cost effective.

As previously noted, not all municipalities "house" impaired waters and not all municipalities "house" the most effective pollution reducing acres of the impaired waters. Thus, municipalities are encouraged to participate in **regional projects** that may be outside of their municipal boundaries. Such projects will result in maximum benefit to municipal participants, the County, and the Chesapeake Bay.

BMPs Not in the Current Bay Model

The current Chesapeake Bay Model has limitations, which results in certain types of pollutant reduction activities (BMPs) not being considered for credit. These limitations may exist for various reasons; however, it is worth examining the potential to revise the Model to credit such activities. A process exists by which new technologies, unthought-of reductions, or intentionally not included BMPs may be included/reconsidered in the Model. Municipal leaf pick-up programs and surface water supplier sediment filtration processes may be examples of such activities. Awareness of such activities or BMPs that reduce nutrients and/or sediment is the first step for credit to be acknowledged in the Model.

There is evidence to indicate that some York County pollution reductions are resulting from a practice that is not recognized in the Model. These pollution reductions should not be overlooked. The merit of working with PA DEP to incorporate such pollution reductions into the Bay Model needs to be determined. Nevertheless, due to the complexities of the Model, potential difficulty in calculating pollutant reductions, and ecological factors that influence reductions, obtaining credit may be a lengthy process, if possible at all.

Success of this solution will be contingent upon availability of necessary data to document the pollution reduction and cooperation from regulatory agencies. There is potential for supporting documentation to exist on pollutant reductions resulting from some activities, such as municipal leaf/yard waste pick-up programs and sediment removal from surface water supplier intakes. For example, municipalities may track tonnage of waste picked up, while water treatment plants may track the tonnage of sediment removed from their source water. This data, as well as additional information, would likely be needed to obtain credit retroactively, and annually into the future, for these types of activities. As stated previously, US EPA and the Chesapeake Bay Program are in the process of developing guidance that will be beneficial to the data collection effort. It is also important to note that for BMPs to be credited under this solution, they must have been implemented on or after January 1, 2006.



Criteria for Evaluating Solutions

Cost versus effectiveness is the ultimate bottom line when considering solutions; how to get the proverbial “biggest bang for the buck.” The effectiveness of each solution would be based upon the size of the pollutant load that is cleaned up by a particular remedy and the time it takes to accomplish it. The catch is that many factors come into play when calculating both the “bang” and the “buck.”

Among the factors are geographic considerations, such as outfall location, headwater areas and confluences. In addition to location within the watershed, environmental factors, such as soils, geology, impaired streams (see Appendix B) and species of concern; operation/maintenance; and sustainability need to be analyzed when contemplating the most effective solution to reduce nutrient/sediment pollution. The cost of implementing the solution also needs to be considered, in conjunction with effectiveness, to ensure practicality, as well as getting the most pollutant reduction for each dollar spent. At times, site restraints may prevent the use of the most effective and/or the least expensive solution. Among the common restraints are location of solutions, pollutant sources, population centers, types of land use, landowners, and funding sources.

When calculating financial costs for a particular solution, the achievement of multiple objectives should likewise be considered. York County has many plans, assessments, and reports concerning the County’s water resources, all with recommendations, goals, and objectives. For example, if a particular pollutant reduction solution also reduces an environmental hazard and/or provides an identified recreational need, achievement of multiple benefits may turn an otherwise economically impractical solution into the most cost effective remedy. Established TMDLs, Watershed/Rivers Conservation Plans, MS4 permits, County land preservation programs, and County/municipal comprehensive plans are some examples of environmental planning efforts throughout the County that should be consulted when establishing project priorities for this Plan.

The criteria presented above for evaluating solutions can be summarized as follows:

- | | |
|---------------------------------|-------------------------------|
| ▶ BMP efficiency (cost/benefit) | ▶ Pollutant source/type |
| ▶ Target impaired waters | ▶ Secondary benefits |
| ▶ Cooperative partners | ▶ Public vs. private projects |
| ▶ MS4 compatibility | ▶ Funding availability |



Lack of vegetation contributes to stream bank erosion and scouring.

Section V. Strategies

The solutions identified in Section IV of this Plan are effective at reducing pollutants only if implemented. The focus of this Section is to establish viable strategies by which identified solutions will be implemented throughout York County. These strategies relate solely to the solutions recommended in this Plan.

Additionally, it is important to reiterate that these strategies are intended to not only clean up York County waters and assist the County with meeting its Draft Planning Targets, but also to aid Pennsylvania in meeting its target allocations. Through implementation of the strategies noted in this Plan, strides can also be made in helping the County to **not** be subjected to potential US EPA backstops in the future.

This Plan is a start for municipal action. It did some up front thinking to identify priority areas and priority tools that make sense. A countywide or regional approach to implementation may realize an increased chance of success.

It is apparent that local governments will need to use coordination, cooperation and communication to carry out many of the strategies recommended in this Plan. This includes, but is not limited to, engaging citizens, environmental organizations, non-profit groups, and public/private foundations. Often times, these groups will gladly volunteer to support local initiatives that restore and protect local waters when they understand the threats to those waters. Additionally, financial resources and technical assistance will likely be needed.

Rather than just listing strategies, a table is being used to set forth the strategies to implement the solutions. The table (See pages 24 and 25) sets forth not only implementation strategies for each of the four (4) solutions, but also notes the recommended time frame for implementation, the lead and/or partner agencies responsible for implementation of the strategy, and tasks that the Coalition for Clean Waters could carry out to assist with implementation. This format is often referred to as a “crosswalk.”

The “Lead Agency” refers to the entity that would take primary responsibility for implementing the strategy, while “Partner(s)” refers to entities that would assist the Lead Agency with implementing the strategy. The time frames for implementation are described as follows:

- Ongoing - Tasks that are initiated as the opportunity arises and should continue.
- Immediate - Tasks that should be undertaken as soon as possible following completion of the Plan.

- **Short-Term** - Tasks that should be implemented within years one (1) through four (4) following completion of the Plan. This reflects implementation by US EPAs 2017 milestone, which has a target of meeting 60% of the pollutant reductions.
- **Long-Term** - Tasks that will be implemented in year five (5) or longer following completion of the Plan.

Key Strategies

A key strategy, supported by PA DEP, that is worthy of specific mention is the preparation of a **County or Regional Chesapeake Bay Pollution Reduction Plan (CBPRP)**. All MS4 municipalities will be required to submit a CBPRP to PA DEP within one (1) year of receiving their MS4 Permit. Through an intergovernmental cooperative effort, a single Plan could be prepared at a lesser cost than multiple individual Plans. This cost savings could then be directed to implementing the BMPs. Additionally, this effort would enable participating municipalities to contribute to potentially larger structural BMP projects that would result in greater strides toward meeting the County targets. Likewise, they would receive credit for contributing to such projects, regardless of whether they were located in their MS4 urbanized area. The premise is that successful implementation of large projects identified in a County or Regional CBPRP could result in the reduction of more pollutants than an abundance of smaller projects listed in individual municipal CBPRPs.

Another notable strategy is using the **York County Integrated Water Resources Plan (IWRP) Flowchart Tool**. This web-enabled tool (www.paiwrp.com) integrates many of the solutions identified by this WIP into an overall process, addressing water related issues in a holistic manner. The development of a methodology by which municipalities could incorporate the Flowchart Tool into regulations, policies and/or procedures, would facilitate implementation of the County's WIP, largely by addressing its identified solutions.

Stormwater Financing

As noted above, financial resources will likely be needed to plan and implement many of the strategies set forth in this Plan. Among these resources are loans, grants, technical assistance, fundraising, and in-kind services. Funding is available from numerous governmental and non-governmental agencies, as well as private interests. Other stormwater financing options that are becoming more prevalent include taxes, fees, special assessments and bonds. Creative financing, whereby a mix of resources are combined to carry out stormwater planning and implementation projects, will likely be a beneficial avenue to pursue.

Appendix F contains information on an array of local, State, and Federal financial resources. It also includes a brief description of, and links to, guidance documents, case

studies, and training materials that can assist local governments and other stakeholders in understanding the many available funding options for stormwater projects.

When seeking funding, it is important to keep in mind that projects that have been identified in an adopted/approved plan, regional projects, and projects needed to meet permit obligations are often ranked higher. Also in-kind services can often be used to meet grant match requirements. This can range from services provided by the local municipality to services provided by other organizations.

With regard to fundraising, it may be advantageous to have a fiscal sponsorship. Through a fiscal sponsorship, a municipality or organized group can raise funds as charitable contributions without the necessity of obtaining its own 501(c)(3) status. This can serve as an impetus to stimulate project interest and donations. A fiscal sponsorship also allows municipalities/organizations to access grant funds requiring a 501(c)3 applicant. The Community Foundation of York is one entity to pursue for a fiscal sponsorship. Another is the Partnership for Economic Development of York County (PEDYC), however, it only acts as a fiscal sponsor for economic and community development projects in the County that support the goals of the York County Economic Development Plan. There is potential for some stormwater BMP projects to be considered a community or economic development project, particularly when it is a park, parking area, or business area improvement project.

Additionally, many service organizations are available to assist with project implementation, which can result in cost savings. Among these organizations are watershed associations, boy scouts, girl scouts, 4-H clubs, senior centers, church youth groups, civic groups, and environmental organizations. Also, the York County Prison has a program through which supervised inmates can assist with various types of projects.



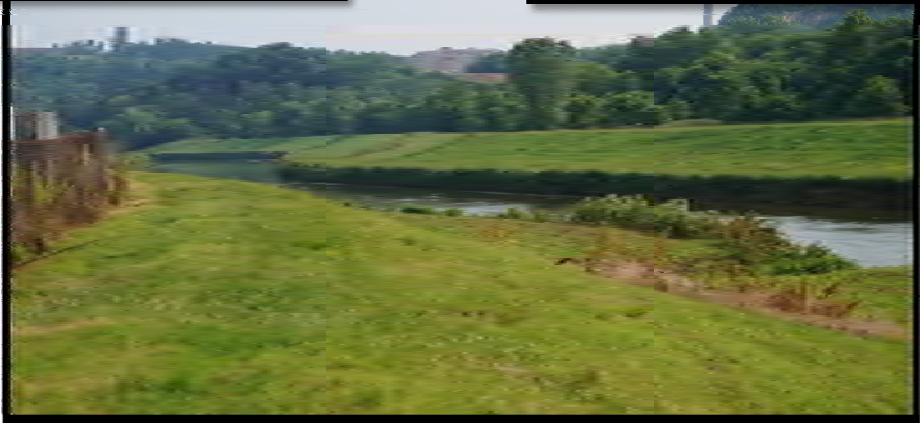
YORK COUNTY WIP - IMPLEMENTATION STRATEGIES

Strategy	Time Frame	Lead Agency	Partner(s)	Coalition for Clean Waters Tasks
SOLUTION: CAPTURE UNREPORTED PROJECTS				
Develop a protocol for survey/data collection to assure that the necessary reporting information is consistently being collected.	Immediate	YCCD	DEP, YCPC	Assist with determining what type of data is required and how it should be collected.
Municipalities hire/train technicians and/or interns to survey county & collect data using the protocol developed by the County.	Short Term	Municipality	YCCD	Prepare job description; training & resource needs; data management.
Develop an interactive blog to discuss watershed projects that have not been captured in the Chesapeake Bay Model.	Short Term	YCPC	DEP, Municipalities, YCCD	Explore existing/new social media opportunities.
Review permits/projects back to 01/01/2006 to capture non-cost-shared BMPs.	Short Term	Municipality	DEP, YCCD, YCPC	Determine what projects DEP has not captured; coordinate with DEP; Streamline to prevent duplication.
Contribute resources to YCCD to implement Chesapeake Bay technician delegation agreement.	Short Term	Municipality	YCCD	Assist with determining what type of data is required and how it should be collected.
Form a stormwater authority whose tasks would include identifying past stormwater management projects and tracking future projects not cost shared by State/Federal programs, then reporting the projects to DEP for credit toward reducing pollutants.	Short Term	Municipality County	YCCD, YCPC	
Use York County IWRP Flowchart Tool (www.paiwrp.com) to capture non-cost-shared projects in the future.	Long Term	DEP	Municipalities, YCCD, YCPC	Provide education & outreach to local governments, engineers, and others.
SOLUTION: EXISTING PROGRAM ADMINISTRATION				
Enforce existing zoning, subdivision/land development, floodplain and stormwater management ordinances.	Ongoing	Municipality	YCCD, YCPC	Develop memorandum's of understanding (MOUs).
Use Nutrient Credit Trading Program as an option for permit compliance.	Ongoing	DEP	Municipalities, YCCD	Develop sediment credit process, i.e. stormwater capacity.
Provide education related to baseline requirements for NPDES Permits, Conservation Plans, Nutrient Management Plans, Manure Management Plans, and Stormwater Management Ordinances.	Ongoing	YCCD	Municipalities, YCPC	
Develop educational materials and offer to make educational presentations to residents and community groups.	Ongoing	YCPC	Municipalities, YCCD	Assist with development of a uniform and consistent message & educational materials; identify target audiences & multi-media resources.
Assist YCCD, as requested, to help County come into regulatory compliance; encourage use of technical service providers.	Short Term	Municipality	YCCD	Develop list of technical service providers.
Form a stormwater authority whose tasks would include assisting with implementation of stormwater management ordinances and MS4 permit obligations.	Short Term	Municipality County	YCCD, YCPC	
SOLUTION: BMPS / NON-STRUCTURAL				
Provide technical assistance to municipalities on how to conduct an assessment of their ordinances with regard to Low Impact Development provisions using the Center for Watershed Protection evaluation tool.	Ongoing	YCPC	Municipality	Facilitate municipal memorandum's of assistance (MOAs), if needed.
Adopt an On-Lot Disposal System (OLDS) Management Program.	Immediate	Municipality	YCPC	Promote DEPs alternative systems.

Strategy	Time Frame	Lead Agency	Partner(s)	Coalition for Clean Waters Tasks
SOLUTION: BMPS / NON-STRUCTURAL CONTINUED				
Consider adoption of Urban Nutrient Management provisions that limit the application of lawn fertilizers.	Immediate	Municipality	YCPC	
Amend ordinances to add provisions for Conservation by Design, Low Impact Development, Green Infrastructure, and Environmental Protection. (see PA DEP BMP Manual)	Short Term	Municipality	YCCD, YCPC	Support demonstration projects & posting of examples on website.
Incorporate use of the York County IWRP Flowchart Tool (www.paiwrp.com) into municipal project/permitting processes.	Short Term	Municipality	YCPC	
Incorporate Low Impact Development/Green Infrastructure techniques into proposed and future public facility improvement projects, such as municipal buildings, infrastructure, trails, and parks.	Ongoing	Municipality	YCCD, YCPC	
Engage in Private/Public Partnerships to implement structural BMPs.	Ongoing	Municipality	Property Owners, Watershed Org., YCCD, YCPC	
Participate in development of a County or Regional Chesapeake Bay Pollution Reduction Plan (CBPRP). Through an intergovernmental cooperative effort, a single Plan could be prepared at a lesser cost than multiple individual Plans. This cost savings could then be directed to implementing the BMPs. (Concept supported by DEP & US EPA)	Immediate	YCPC	CBF, DEP, Municipalities, Municipal Engineers, YCCD	
Use Recommended Pollution Reduction Actions & Actions Opportunity Table as resources to meet CBPRP requirements.	Immediate	Municipality	YCCD, YCPC	
Use Recommended Pollutant Reduction Actions & Actions Opportunity Tables to determine & implement projects with the "biggest bang for the buck" to maximize pollution reduction for least money.	Immediate	Municipality	Property Owners, Watershed Org., YCCD, YCPC	
Develop a project opportunities webpage that lists specific BMP projects that would yield notable pollutant reductions and present opportunities for cooperation/partnerships, as well as list the host municipality(ies) for the project.	Immediate	YCPC	Municipality, YCCD	Assist with identifying specific projects and marketing projects to potential partners.
Consider requiring Low Impact Development/Green Infrastructure techniques to be incorporated into projects approved for funding.	Short Term	YCPC		
Form a stormwater authority that would create a stable source of funding for stormwater management planning and projects, as well as provide incentives for private stormwater management initiatives.	Short Term	Municipality County	YCCD, YCPC	
SOLUTION: BMPs NOT IN THE CURRENT BAY MODEL				
Use the York County IWRP Flowchart Tool (www.paiwrp.com) before initiating any project.	Immediate	Municipality	YCPC	
Municipalities inform YCPC if they implement a BMP they feel reduces pollution and should be included into the Bay Model (leaf pick-up, sediment removal).	Immediate	Municipality	DEP, YCCD, YCPC	Coordinate/develop protocol for initiating process to submit new BMPs for inclusion in the Chesapeake Bay Model.
Develop an interactive blog to discuss watershed projects that could be added to the Chesapeake Bay Model.	Short Term	YCPC	DEP, YCCD	
Form a stormwater authority whose tasks would include tracking and reporting stormwater management projects to DEP for potential inclusion in the Chesapeake Bay Model.	Short Term	Municipality County	YCCD, YCPC	



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APPENDIX A

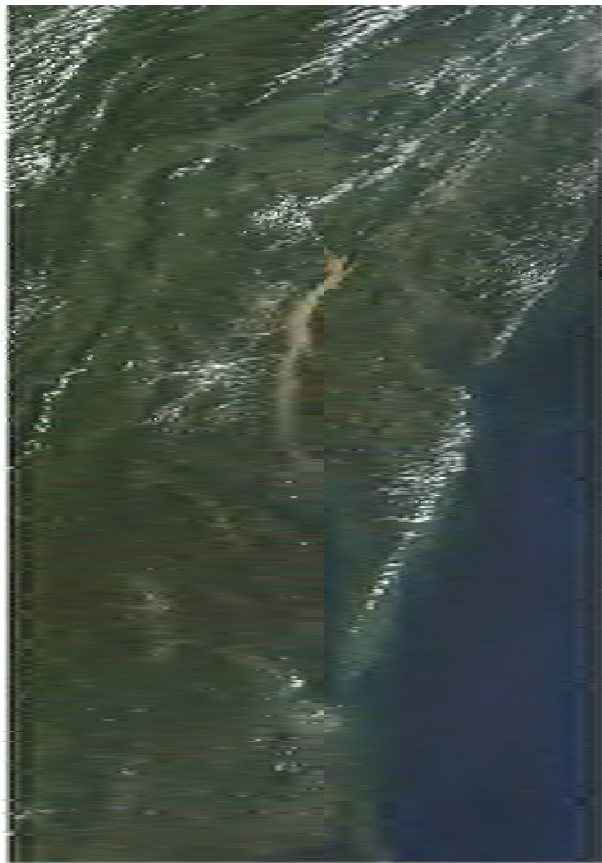
York County Planning Targets

(Source: PA Chesapeake Bay Phase II WIP)

Satellite images of the Chesapeake Bay before and after Tropical Storm Lee. Plumes of sediment were observed flowing down the Susquehanna River into the Chesapeake Bay after the remnants of Tropical Storm Lee brought heavy rainfall to Pennsylvania and Maryland.



August 23, 2011



September 13, 2011

York County Planning Targets

(Source: PA Chesapeake Bay Phase II WIP)

What are Planning Targets? The Chesapeake Bay TMDL established regulatory waste load allocations and load allocations for nitrogen, phosphorus and total suspended solids (TSS) based in part on Pennsylvania's Chesapeake Watershed Implementation Plan (WIP). To facilitate local implementation of necessary reduction actions to meet the allocations, US EPA directed the Chesapeake watershed states to sub-divide the reductions by local areas. Pennsylvania chose to sub-divide loads at the county level, as the US EPA Chesapeake Bay Watershed Model is based in part on county level data. The county planning targets address only those loads that can be reduced by Best Management Practices (BMPs). This includes both regulatory and non-regulatory loads for agriculture, stormwater and forest. Wastewater treatment plant reductions are not addressed because they were previously addressed by the 2006 Chesapeake Bay Compliance Strategy.

The following targets are for planning purposes only and do not become regulatory allocations at the county level.

York County Nitrogen Planning Target	Pounds
2009 Progress Load	10,381,002
2010 Current Load	10,192,541
2017 Interim Planning Target - 60%	7,951,720
2017 Nitrogen Reductions (2010-2017)	2,429,282
2025 Planning Target – 100%	6,332,199
2025 Total Nitrogen Reductions (2010-2025)	4,048,803

York County Phosphorus Planning Target	Pounds
2009 Progress Load	194,967
2010 Current Load	192,604
2017 Interim Planning Target - 60%	159,704
2017 Phosphorus Reductions (2010-2017)	35,262
2025 Planning Target - 100%	136,196
2025 Total Phosphorus Reductions (2010-2025)	58,771

York County Total Suspended Solids (TSS) Planning Target	Pounds
2009 Progress Load	254,167,549
2010 Current Load	238,273,838
2017 Interim Planning Target - 60%	194,401,015
2017 TSS Reductions (2010-2025)	59,766,534
2025 Planning Target - 100%	154,556,659
2025 Total TSS Reductions (2010-2025)	99,610,891

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APPENDIX B

York County Waters* on Pennsylvania's “Impaired Waters” List

(Source: PA DEP 2012 Water Quality Monitoring and Assessment Report)

*includes only those impaired, to some extent, due to nutrients and sediment



**York County Waters* on
Pennsylvania's 2012 "Impaired Waters" List**

Waterbody	Impaired Use	Source	Cause
CODORUS CREEK WATERSHED			
Barshinger Creek	Aquatic Life	Agriculture	Siltation
Centerville Creek	Aquatic Life	Agriculture	Siltation
Codorus Creek	Aquatic Life	Urban Runoff/Storm Sewers, Agriculture, Industrial Point Source	Siltation, Excessive Algal Growth, Unknown Toxicity, Color
Mill Creek	Aquatic Life	Urbanized Runoff/Storm Sewers, Agriculture, Grazing Related Agriculture, Crop Related Agriculture, Land Development	Siltation, Nutrients
Gitts Run	Aquatic Life	Agriculture	Siltation
Foust Creek	Aquatic Life	Agriculture	Siltation
Inners Creek	Aquatic Life	Agriculture	Siltation
Oil Creek	Aquatic Life	Abandoned Mine Drainage, Crop Related Agricultural, Agriculture	Metals, PH, Suspended Solids, Nutrients, Siltation
Pierceville Run	Aquatic Life	Agriculture	Siltation
Stoverstown Branch	Aquatic Life	Agriculture, Crop Related Agriculture, Grazing Related Agriculture, Urban Runoff/Storm Sewers	Nutrients, Siltation, Unknown
South Branch Codorus Creek	Aquatic Life	Agriculture, Urban Runoff/Storm Sewers, Municipal Point Source	Nutrients, Suspended Solids, Siltation, Flow Alterations
CONEWAGO CREEK WATERSHED			
Beaver Creek (North)	Aquatic Life	Agriculture	Siltation
Red Run	Aquatic Life	Agriculture	Siltation
Musser Run	Aquatic Life	Agriculture, Other	Suspended Solids
Beaver Creek (South)	Aquatic Life	Crop Related Agriculture, Flow Regulation/Modification	Siltation
Bennett Run	Aquatic Life	Upstream Impoundment	Siltation

**York County Waters* on
Pennsylvania's 2012 "Impaired Waters" List**

Waterbody	Impaired Use	Source	Cause
Bermudian Creek	Aquatic Life	Agriculture, Industrial Point Source	Siltation, Organic Enrichment/Low D.O., Nutrients
North Branch Bermudian Creek	Aquatic Life	Agriculture	Nutrients, Siltation
Plum Creek	Aquatic Life	Agriculture, Urban Runoff/Storm Sewers	Siltation
Mud Run	Aquatic Life	Hydromodification, Municipal Point Source	Excessive Algal Growth
Honey Run	Aquatic Life	Crop Related Agriculture, Golf Courses	Siltation
Little Conewago Creek	Aquatic Life	Agriculture, Surface Mining, Crop Related Agriculture, Land Development, Flow Regulation/ Modification, Golf Courses	Siltation
Paradise Creek	Aquatic Life	Agriculture, Crop Related Agriculture	Siltation
Pinchot Lake	Aquatic Life	Agriculture, Urban Runoff/Storm Sewers	Organic Enrichment/Low D.O.
Conewago Creek	Aquatic Life, Fish Consumption	Agriculture, Unknown	Siltation
KREUTZ - MUDDY CREEKS WATERSHED			
Fishing Creek (South)	Aquatic Life	Channelization, Urban Runoff/Storm Sewers	Siltation, Nutrients, Unknown Toxicity
Pine Run	Aquatic Life	Agriculture	Siltation
North Branch Muddy Creek	Aquatic Life	Agriculture	Siltation
Bull Run	Aquatic Life	Removal of Vegetation	Nutrients, Siltation
Scott Creek	Aquatic Life	Municipal Point Source, Urban Runoff/Storm Sewers	Chlorine, Nutrients, Siltation
Kreutz Creek	Aquatic Life	Urban Runoff/Storm Sewers, Removal of Vegetation, Road Runoff	Siltation
YELLOW BREECHES CREEK WATERSHED			
Yellow Breeches Creek	Aquatic Life, Recreation	Agriculture, Construction	Siltation, Organic Enrichment/Low D.O., Pathogens,

**York County Waters* on
Pennsylvania's 2012 "Impaired Waters" List**

Waterbody	Impaired Use	Source	Cause
Big Spring Run	Aquatic Life	Construction, Habitat Modification, Agriculture, Crop Related Agriculture	Siltation, Unknown Toxicity, Nutrients
Fishing Creek (North)	Aquatic Life	Construction	Siltation
Marsh Run	Aquatic Life	Urban Runoff/Storm Sewers	Siltation
Millers Run	Aquatic Life	Source Unknown	Siltation
Stony Run (West)	Aquatic Life	Crop Related Agriculture, Grazing Related Agriculture, Urban Runoff/Storm Sewers	Nutrients, Siltation, Unknown
Stony Run (East)	Aquatic Life	Agriculture, Unknown	Organic Enrichment/Low D.O., Siltation
Fishers Run	Aquatic Life	Construction, Agriculture	Organic Enrichment/Low D.O., Siltation
Dogwood Run	Aquatic Life, Potable Water Supply	Agriculture, Municipal Point Source, Source Unknown	Organic Enrichment/Low D.O., Siltation, Pathogens, Suspended Solids

*The above listing is an excerpt from PA DEP's 2012 Water Quality Monitoring and Assessment Report [Section 303(d) list] and includes only those waters impaired, to some extent, due to nutrients and sediment. The Section 303(d) list was based on the best available information at the time it was developed. The Report is updated biannually and as waters are improved, they will be "delisted." It is also important to note that water issues in York County go beyond the impairments included on the list above; problems exist, to varying degrees, countywide.

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APPENDIX C

Federal/State Programs that Capture BMPs

(Source: PA DEP)

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FEDERAL/STATE PROGRAMS THAT CAPTURE BMPs

Programs

DEP Abandoned Mine Land Reclamation Program

DEP Chesapeake Bay Implementation Grants

DEP Nutrient Trading Program

DEP Section 319 Non-Point Source Program

DEP Storm Water NPDES (E&S control/SWM) and Waterways Engineering (stream restoration)

DEP Stream Bank Fencing Program

DCNR Forest Stewardship Program

DCNR & PA Game Commission (tree harvesting)

PA Act 6 Nutrient Management Program

PA Growing Greener Grant Program

PA Stream Releaf Program

Capital RC&D's Grassroots Program (grazing practices)

FSA CRP/CREP programs

NRCS program activities

National Fish & Wildlife Foundation grants

PennVest Program

State Conservation Commission (SCC) Resource Enhancement and Protection (REAP) Program

SCC Dirt and Gravel Road Program

USDA Rural Development Program

Source: PA DEP

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APPENDIX D

Recommended Pollution Reduction Actions and Descriptions of Actions



Before (left) and after (below) photos of an example of a roadside rain garden



YORK COUNTY WIP - RECOMMENDED POLLUTANT REDUCTION ACTIONS

Opportunity Table BMP Category	York County Urban BMP	Unit	Average Efficiency (lb/yr)/ Unit Nitrogen	Average Efficiency (lb/yr)/ Unit Phosphorus	Average Efficiency (lb/yr)/ Unit Sediment	Median Life Cycle Cost/Unit Installed	Median Lifecycle Cost per TN lb	Median Lifecycle Cost per TP lb	Median Lifecycle Cost per TSS lb
U-5	Erosion and Sediment Control on Construction Land	acre	15.05	1.55	4012.36	\$754	\$3	\$24	\$0.01
U-3	Forest Harvest Practices	acre	24.14	0.26	645.54	\$4	\$0.01	\$1	\$0.00
U-5	Erosion and Sediment Control on Extractive (Mining, Quarrying) Land	acre	8.06	0.74	1399.95	\$754	\$5	\$51	\$0.03
U-2	Wetland Restoration	acre	49.98	1.20	3031.15	\$4,471	\$4	\$187	\$0.07
U-2	Urban Stream Restoration	foot	0.20	0.68	310.00	\$961	\$240	\$71	\$0.16
U-5	Vegetated Open Channels - A/B soils, no underdrain	impervious acre treated+ ~4x acres of pervious (based on ratio of impervious / pervious in LR Segment)	41.97	0.94	1931.85	\$15,684	\$19	\$837	\$0.41
U-5	Vegetated Open Channels - C/D soils, no underdrain	impervious acre treated+ ~4x acres of pervious (based on ratio of impervious / pervious in LR Segment)	9.33	0.21	1379.89	\$15,684	\$84	\$3,743	\$0.57
U-4	Impervious Surface Reduction (Techniques / Treatments) rooftop disconnect and rainbarrels	impervious acres treated	11.14	0.87	1678.88	\$28,844	\$129	\$1,659	\$0.86
U-5	Infiltration Practices	impervious acre treated+ ~4x acres of pervious (based on ratio of impervious / pervious in LR Segment)	75.58	1.88	2596.31	\$96,483	\$64	\$2,562	\$1.86
U-5	Bioswale	1 impervious acre treated plus 1 pervious acre treated	34.88	1.07	1760.94	\$71,530	\$103	\$3,328	\$2.03
U-5	Wet Ponds & Wetlands	acre treated	18.32	1.00	1639.77	\$68,752	\$188	\$3,448	\$2.10
U-5	Bioretention - no underdrain	1 impervious acre treated plus 1 pervious acre treated	39.86	1.22	1981.05	\$100,812	\$126	\$4,132	\$2.54
U-1	Forest Buffers - Urban	acres in buffer	19.02	0.47	501.04	\$25,550	\$67	\$2,711	\$2.55
U-5	Dry Extended Detention Ponds	impervious acre treated+ ~4x acres of pervious (based on ratio of impervious / pervious in LR Segment)	18.32	0.44	1639.77	\$89,585	\$244	\$10,096	\$2.73
U-5	Filtering Practices	1 impervious acre treated plus 1 pervious acre treated	19.93	0.86	1760.94	\$100,812	\$253	\$5,856	\$2.86

*Red numbers indicate high efficiency and low cost.

*Yellow highlighted BMP's indicate "biggest bang for the buck;" meaning those BMPs have good numbers for 2 out of the 3 pollutants.

YORK COUNTY WIP - RECOMMENDED POLLUTANT REDUCTION ACTIONS

Opportunity Table BMP Category	York County Agricultural BMP	Unit	Average Efficiency (lb/yr)/ Unit Nitrogen	Average Efficiency (lb/yr)/ Unit Phosphorus	Average Efficiency (lb/yr)/ Unit Sediment	Median Life Cycle Cost/Unit Installed	Median Lifecycle Cost per TN lb	Median Lifecycle Cost per TP lb	Median Lifecycle Cost per TSS lb
A-1	Grass Buffers - Streamside in Pasture	acres in buffer	219.89	8.54	650.38	\$ 1,028	\$0.23	\$6	\$0.08
A-1	Pasture Fencing	acres in buffer	195.97	8.08	538.70	\$ 3,759	\$0.96	\$23	\$0.35
A-2	Wetland Restoration - Streamside in Pastures	acre	196.73	8.25	1388.84	\$ 4,471	\$1.14	\$27	\$0.16
A-2	Wetland Restoration	acre	49.98	1.20	3031.15	\$ 4,471	\$4.47	\$187	\$0.07
A-6	Conservation Plans	acre	2.13	0.08	355.00	\$ 12	\$0.29	\$7	\$0.00
A-5	Conservation Tillage on Land with manure application	acre	5.60	0.03	1890.29	\$ 37	\$0.33	\$65	\$0.00
A-5	Continuous No-Till	acre	8.96	0.46	1518.70	\$ 37	\$0.21	\$4	\$0.00
A-6	Cover Crops - High Till	acre	24.35	0.08	386.40	\$ 97	\$0.20	\$61	\$0.01
A-1	Forest Buffers - Agriculture	acres in buffer	146.24	1.78	5208.06	\$ 2,515	\$0.86	\$71	\$0.02
A-1	Grass Buffers	acres in buffer	112.02	1.59	4268.34	\$ 1,028	\$0.46	\$32	\$0.01
A-3	Tree Planting - Ag	acre	43.53	0.95	2871.21	\$ 1,018	\$1.17	\$54	\$0.02
A-5	Conservation Tillage on Land without manure application	acre	4.39	0.23	1137.02	\$ 37	\$0.42	\$8	\$0.00
A-1	Forest Buffer - Streamside in Pasture	acres in buffer	64.15	1.83	1041.51	\$ 2,515	\$1.96	\$69	\$0.12
A-5	Barnyard Runoff Controls	acre AFO	388.13	50.02	403.40	\$ 100,056	\$12.89	\$100	\$12.40
A-6	Cover Crops - Low Till	acre	22.76	0.00	0.00	\$ 97	\$0.21	--	--
A-5	Manure Injections - Tilled Land	acre	15.62	0.00	0.00	\$ 194	\$0.62	--	--
A-5	Poultry Litter Injection - Tilled Land	acre	15.62	--	--	\$ 194	\$0.62	--	--
A-2	Non-Urban Stream Restoration	foot	0.20	0.07	310.00	\$ 114	\$28.40	\$84	\$0.02
A-6	Upland Precision Rotational Grazing	acre	1.89	0.15	32.85	\$ 93	\$2.46	\$32	\$0.14
A-6	Horse pasture management	acre	--	0.12	43.79	\$ 1,200	--	\$501	\$1.37

*Red numbers indicate high efficiency and low cost.

*Orange highlighted BMPs indicate "biggest bang for the buck;" meaning those BMP's have good numbers for 3 out of the 3 pollutants.

*Yellow highlighted BMPs are the second best choice; meaning those BMPs have good numbers for 2 out of the 3 pollutants.

*Green highlighted BMP is the "biggest bang for the buck" BMP that would **not** be included within a Conservation Plan.

Description of Actions

The following descriptions are associated with the BMPs listed on the preceding Recommended Pollutant Reduction Actions Table. The descriptions are from the PA DEP Phase II Watershed Implementation Plan (WIP) and are categorized under Agricultural BMPs and Urban BMPs.

Agricultural BMPs

Grass Buffers - Agricultural riparian grass buffers are linear strips of grass or other non-woody vegetation maintained between the edge of fields and streams, rivers or tidal waters that help filter nutrients, sediment and other pollutant from runoff. The recommended buffer width for riparian forests buffers (agriculture) is 100 feet, however a minimum width of 35 feet is required.

Pasture Fencing - Pasture fence involves installation of fencing that excludes narrow strips of land along streams from pastures and livestock. The implementation of stream fencing should substantially limit livestock access to streams, but can allow for the use of limited hardened crossing areas where necessary to accommodate access to additional pastures or for livestock watering. Where no access to the stream is allowed, alternative off-stream watering may be provided. The fenced areas may be planted with trees or grass.

Wetland Restoration - Agricultural wetland restoration activities re-establish the natural hydraulic condition in a field that existed prior to the installation of subsurface or surface drainage. Projects may include restoration, creation and enhancement acreage. Restored wetlands may be any wetland classification including forested, scrub-shrub or emergent marsh.

Conservation Plans - Farm conservation plans are a combination of agronomic, management and engineered practices that protect and improve soil productivity and water quality, and prevent deterioration of natural resources on all or part of a farm. Plans may be prepared by staff working in conservation districts, natural resource conservation field offices or a certified private consultant. In all cases the plan must meet technical standards.

Conservation Tillage - Conservation tillage involves planting and growing crops with minimal disturbance of the surface soil. Conservation tillage requires two components, (a) a minimum 30% residue coverage at the time of planting, and (b) a non-inversion tillage method. No-till farming is a form of conservation tillage in which the crop is seeded directly into vegetative cover or crop residue with little disturbance of the surface soil. Minimum tillage farming involves some disturbance of the soil, but uses tillage equipment that leaves much of the vegetation cover or crop residue on the surface.

Continuous No-Till - The Continuous No-Till BMP is a more comprehensive type of conservation tillage practice in which soil disturbance by plows, disk or other tillage equipment is eliminated. In most cases large amounts of crop residue are left on the surface to protect the soil from storm events. To be considered as no-till a minimum of 50% residue must be maintained. Continuous No-Till involves no-till methods on all crops in a multi-year rotation.

Cover Crops - Cereal cover crops reduce erosion and the leaching of nutrients to groundwater by maintaining a vegetative cover on cropland and holding nutrients within the root zone. This practice involves the planting and growing of cereal crops (non-harvested) with minimal disturbance of the surface soil. The crop is seeded directly into vegetative cover or crop residue with little disturbance of the surface soil. These crops capture or “trap” nitrogen in their tissues as they grow. By timing the cover crop burn or plow-down in spring, the trapped nitrogen can be released and used by the following crop. Cover crops may be considered to be either “Early” or “Late” Season types.



Forest Buffers - Agricultural riparian forest buffers are linear wooded areas along rivers, stream and shorelines. Forest buffers help filter nutrients, sediments and other pollutants from runoff as well as remove nutrients from shallow groundwater. The recommended buffer width for riparian forest buffers (agriculture) is 100 feet, with a 35 feet minimum width required.

Tree Planting - The tree planting BMP includes any tree planting on agricultural lands (particularly row crops), except those used to establish riparian forest buffers, targeting lands that are highly erodible or identified as critical resource areas. Tree planting is also called afforestation because it involves growing trees and converting the land use from agricultural to forest. This BMP results in a landuse conversion from row crop to forest. It is assumed that the density of

the plantings is sufficient to produce a forest like condition over time.

Barnyard Runoff Controls - Barnyard Runoff Controls are designed to improve water quality, reduce soil erosion, increase infiltration, and protect structures. Controls may include structures that collect, control, and transport precipitation from roofs and additional structures or diversions to direct runoff away from barnyards, as well as to control runoff generated by barnyards. Vegetated treatment area may be included to

improve water quality by reducing loading of nutrients, organics, pathogens, and other contaminants associated with barnyards.

Manure Injections - This practice involves the direct injection of manure slurry into soil. Direct injection is applicable to swine, dairy and beef species. Manure can be successfully injected in both conventional tillage and most no-till systems. This method allows a more precise application of manure to the fields so farmers are less likely to apply more manure than crops can utilize. Direct injection of manure slurry also provides a significant reduction in land application odor and ammonia emissions release when compared to conventional manure surface broadcasting.

Poultry Litter Injection - The subsurface injection of poultry manure has been demonstrated in university and USDA-ARS research studies to significantly reduce nutrient losses for both surface runoff and ammonia emissions. The proposed practice is applied on a per acre basis, and can be implemented and reported for cropland on both lo-till and hi-till land uses that receive manure, pasture and hay with manure.

Non-Urban Stream Restoration - This practice involves treatments used to stabilize and protect banks of streams or constructed channels to prevent the loss of land, damage to land uses and to reduce offsite or downstream effects of sediment from bank erosion. This may include additional practices to stabilize the bed or bottom of a channel to prevent damaging aggradation of sediment or degradation of the stream bed by grazing animals.

Upland Precision Rotational Grazing - This practice utilizes more intensive forms of pasture management and grazing techniques (in comparison to prescribed grazing) to improve the quality and quantity of the forages grown on pastures and reduce the impact of animal travel lanes, animal concentration areas or other degraded areas of upland pastures. This activity can be applied to pastures intersected by streams or upland pastures outside of the degraded stream corridor (35 feet width from top of bank). The modeled benefits of this practice can be applied to pasture acres in association with or without alternative watering facilities. They can also be applied in conjunction with or without stream access control. This practice requires intensive management of livestock rotation, also known as Managed Intensive Grazing systems (MIG), that have very short rotation schedules. Pastures are defined as having a vegetative cover of 60% or greater.

Horse Pasture Management - Horse pasture management includes maintaining a 50% pasture cover with managed grass species and managing high traffic areas. High traffic area management is utilized to reduce the highest load contributing areas associated with pasture lands, and maintaining a 50% cover will improve the pasture so erosion and nutrient loss is further reduced. High traffic areas are concentration areas within the pasture where the grass is sparse or nonexistent. These often are feeding areas, such as hay deposits around fence lines. These areas are treated as sacrifice areas.

Urban BMPs

Erosion and Sediment Control - Erosion and sediment control practices protect water resources from sediment pollution and increases in runoff associated with land development activities. By retaining soil on-site, sediment and attached nutrients are prevented from leaving disturbed areas and polluting streams. This activity may include the use of features such as a silt fence, slope drain, and permanent vegetation.

Forest Harvest Practices - Forest harvesting practices are a suite of BMPs that minimize the environmental impacts of road building, log removal, site preparation and forest management. These practices help reduce suspended sediments and associated nutrients that can result from forest operations. Example activities include Innovative road design, bridged stream crossings, preservation of stream and wetland buffers, soil stabilization, water bars, logging mats, road surfacing, broad-based dips and avoiding operations when very wet.

Urban Stream Restoration - Stream restoration in urban areas is used to restore the urban stream ecosystem by restoring the natural hydrology and landscape of a stream. Stream restoration in urban areas is used to help improve habitat and water quality conditions in degraded streams. Typically, streams in need of restoring have watershed conditions that have destabilized the stream channel and accelerated the erosion of stream banks. The objectives for stream restoration in urban areas include, but are not limited to, reducing stream channel erosion, promoting physical channel stability, reducing the transport of pollutants downstream, and working towards a stable habitat with a self-sustaining, diverse aquatic community.

Vegetated Open Channel - Vegetated open channels are designed to collect runoff from nearby impervious surfaces and are densely planted with a variety of trees, shrubs and/or grasses. These structures will attenuate and infiltrate part of the captured runoff volume.

Impervious Surface Reduction - This includes practices that reduce the total area of impervious cover and practices that capture stormwater and divert it to pervious areas, subsequently encouraging storm water infiltration. Example activities include natural area conservation, disconnection of rooftop runoff, porous pavement and rain barrels.

Infiltration Practices - Infiltration practices are used to capture and temporarily store the water quality volume before allowing it to infiltrate into the soil, promoting pollutant treatment and groundwater recharge. Examples include infiltration trenches, infiltration basins, and porous pavement.

Bioswale - see filtering practices

Wet Ponds & Wetlands - Wet ponds and wetland practices implemented in urban areas collect and increase the settling of pollutants, and protect downstream channels from

frequent storm events. Wet ponds retain a permanent pool of water. Examples include wet ponds, wet extended detention ponds, retention ponds and constructed wetlands.

Bioretention - see filtering practices

Forest Buffers – Urban - Urban riparian forest buffers are linear strips of maintained woody vegetation that buffer streams, rivers or tidal waters from urban and suburban activity. Forest buffers help filter nutrients, sediments and other pollutants from runoff, as well as remove nutrients from groundwater. The recommended width for riparian forest buffers (urban) is 50 feet with a 35 feet minimum.

Dry Extended Detention Ponds - Dry extended detention ponds are storm water design features that provide a gradual release of a specific volume of water in order to increase the settling of pollutants and protect downstream channels from frequent storm events. Dry extended detention ponds are often designed with small pools at the inlet and outlet of the pond. These BMPs can also be used to provide flood control by including additional detention storage above the extended detention level.

Filtering Practices - Filtering Practices capture and temporarily store the water quality volume and pass it through a filter of sand, organic matter and vegetation, promoting pollutant treatment and recharge. Examples practices include surface sand filters, swales, porous pavement, and bioretention areas (rain gardens).

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APPENDIX E

Actions Opportunity Table

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York County WIP Action Opportunity Table**

PADEP IMPAIRED WATERS				POTENTIAL / TARGETED URBAN BMP SUBCATEGORIES FOR IMPAIRED WATERS						POTENTIAL / TARGETED AGRICULTURAL BMP SUBCATEGORIES FOR IMPAIRED WATERS					
Watershed	Impaired Subwatershed ID	Impaired Waterway*	Municipality	Urban Riparian Buffers (Ac) U-1	Urban Stream Restoration (LF) U-2	Urban Woodland Mgt. (Ac) U-3	Urban Impervious Cover (Ac) U-4	Urban Stormwater Mgt. (Ac) U-5	Urban Nutrient Mgt. (Ac) U-6	Agricultural Buffers (Ac) A-1	Riparian Restoration (LF) A-2	Agricultural Stream Woodland Mgt.(Ac) A-3	Agricultural Impervious Cover (Ac) A-4	Agricultural Stormwater Mgt. (Ac) A-5	Agricultural Conservation (Ac) A-6
Conewago West	68	NB Bermudian Creek	Carroll	5	1,023	19	29	102	151	19	4,075	77	132	73	281
Yellow Breeches	91	Stony Run (West)1	Carroll	0	0	0	0	0	0	10	2,268	0	0	0	0
Yellow Breeches	28	Dogwood Run	Carroll	43	9,424	247	134	490	870	61	13,266	347	623	356	1,327
Yellow Breeches	91	Stony Run (West)2	Carroll	22	4,749	217	71	294	582	53	11,558	528	365	223	1,116
Muddy Creek	76	Pine Run	Chanceford	0	87	4	1	10	14	11	2,425	100	11	9	119
Codorus Creek SB	75	Pierceville Run	Codorus	3	615	17	1	41	59	159	34,673	939	0	39	979
Codorus Creek SB	18	Centerville Creek	Codorus	1	264	7	4	15	26	83	18,172	486	19	11	516
Codorus Creek SB	86	Krebs Valley Run	Codorus	1	198	7	8	17	32	71	15,485	558	1	8	567
Codorus Creek WB	20	Brodbecks Trib	Codorus	0	76	1	2	5	8	29	6,288	97	7	3	107
Codorus Creek WB	86	Buffalo Valley Trib	Codorus	1	252	3	5	14	22	82	17,799	188	0	9	198
Little Conewago	54	Strinestown Trib	Conewago	41	8,886	178	138	226	542	64	14,047	281	364	88	733
Codorus Creek	62	Mill Creek	Dallastown Boro	2	346	10	92	111	213	0	6	0	203	19	223
Codorus Creek EB	47	Inners Creek	Dallastown Boro	0	0	1	51	56	108	0	0	0	107	5	111
Codorus Creek EB	6	Barshinger Creek	Dallastown Boro	5	1,088	17	43	67	126	2	477	7	4	24	36
Muddy Creek	84	Scott Creek	Delta Boro	1	272	23	23	61	107	1	148	13	2	38	53
Yellow Breeches	28	Dogwood Run	Dillsburg Boro	3	568	12	88	107	207	0	19	0	9	20	29
Conewago West	24	Davidsburg Run	Dover	18	3,935	58	55	220	332	241	52,585	771	5	165	941
Conewago West	21	Big Mount Trib	Dover	1	308	3	7	21	31	101	22,094	243	1	14	258
Little Conewago	54	Little Conewago	Dover	35	7,518	53	190	611	854	91	19,774	139	19	421	579
Little Conewago	45	Honey Run	Dover	5	1,150	4	1	40	45	19	4,234	14	0	39	53
Codorus Creek	20	Jerusalem Sch. Rd. Trib	East Manchester	1	222	3	4	11	18	34	7,343	109	0	7	116
Conewago West	65	Musser Run	East Manchester	14	3,090	15	27	103	144	46	10,038	47	3	76	126
Conewago West	91	Bennetts Run	Fairview	26	5,561	154	37	280	472	126	27,541	765	4	243	1,011
Susquehanna River	11	Big Spring Run	Fairview	12	2,642	56	22	95	173	29	6,406	136	2	73	211
Susquehanna River	35	Yocumtown Trib	Fairview	60	12,983	319	235	503	1,056	39	8,580	211	24	267	502
Susquehanna River	35	Fishing Creek (N)	Fairview	10	2,186	87	26	117	229	12	2,599	103	3	90	196
Susquehanna River	59	Marsh Run	Fairview	35	7,682	336	262	346	944	4	965	42	26	85	153
Yellow Breeches	104	Poplar Spring Run	Fairview	60	13,009	347	170	414	931	4	855	23	17	245	285
Yellow Breeches	104	Nauvoo Trib	Fairview	3	676	15	2	25	41	16	3,453	74	0	23	97
Yellow Breeches	104	Millers Run	Fairview	9	1,974	42	9	86	137	39	8,421	181	1	77	258
Susquehanna River	35	Fisher Cem. Trib	Fairview	2	423	12	4	28	44	13	2,932	80	0	23	104
Deer Creek	26	Big Branch	Fawn	1	122	2	3	10	16	29	6,209	121	0	7	128
Deer Creek	26	Falling Branch	Fawn Grove Boro	1	150	1	6	18	25	5	1,118	7	1	11	19
Muddy Creek NB	76	Pine Run	Felton Boro	1	170	5	4	9	17	8	1,771	52	0	5	58
Conewago West	68	NB Bermudian Creek	Franklin	47	10,131	254	219	677	1,150	283	61,719	1,545	22	457	2,024
Yellow Breeches	28	Dogwood Run	Franklin	4	976	116	23	116	254	4	877	104	2	93	199
Conewago West	68	NB Bermudian Creek	Franklintown Boro	0	0	22	23	51	96	0	0	12	2	28	42
Codorus Creek SB	36	Foust Creek	Glen Rock Boro	0	0	0	0	0	0	0	0	0	0	0	0
Codorus Creek SB	86	Glen Rock Valley Trib (S)	Glen Rock Boro	5	1,162	7	9	23	40	3	638	4	1	14	18
Codorus Creek WB	72	Oil Creek	Hanover Boro	0	0	9	235	223	466	0	0	2	24	-12	13
Conewago West	87	Hanover Boro Trib	Hanover Boro	7	1,545	0	146	150	296	0	90	0	15	4	19
Conewago West	87	Pigeon Hills Trib	Hanover Boro	3	604	2	141	197	340	0	79	0	14	55	70
Conewago West	78	Plum Creek	Hanover Boro	2	343	0	27	32	60	0	25	0	3	5	7
Codorus Creek WB	72	Oil Creek	Heidelberg	10	2,177	42	43	99	184	294	63,997	1,227	4	56	1,287
Codorus Creek WB	40	Gitts Run 1	Heidelberg	0	0	0	0	0	0	0	0	0	0	0	0
Codorus Creek WB	40	Gitts Run 2	Heidelberg	0	0	0	0	0	0	0	14	2	0	0	2
Kreutz Creek	50	Kreutz Creek	Hellam	0	70	2	1	1	4	0	-41	-1	0	0	-2
Deer Creek	26	Ebaughs Creek	Hopewell	9	2,012	26	34	88	148	216	46,975	607	3	53	664
Codorus Creek WB	98	Sunnyside Trib	Jackson	3	754	3	21	67	91	22	4,783	21	2	46	69
Codorus Creek WB	98	Nashville Trib	Jackson	8	1,675	5	32	110	146	44	9,682	28	3	77	108
Codorus Creek WB	72	Oil Creek	Jackson	0	18	7	4	15	27	1	178	74	0	11	86
Conewago West	21	Big Mount Trib	Jackson	0	0	0	0	0	1	0	0	4	0	0	4
Little Conewago	54	Little Conewago	Jackson	59	12,806	287	373	921	1,582	221	48,083	1,079	37	548	1,664
Little Conewago	45	Honey Run	Jackson	8	1,834	10	7	272	290	13	2,770	16	1	265	281
Conewago West	9	Bennetts Run	Lewisberry Boro	5	1,075	3	15	41	59	1	315	1	1	26	29
Susquehanna River	35	Fishing Creek (E)	Lower Windsor	1	290	2	2	12	16	3	750	5	0	10	15
Susquehanna River	13	Bull Run	Lower Windsor	3	673	19	10	32	61	14	3,048	87	1	22	110
Codorus Creek	20	Lightners School Trib	Manchester	60	13,124	68	340	603	1,011	45	9,856	51	34	263	348
Codorus Creek	101	Willis Run	Manchester	9	1,926	39	110	200	349	5	1,024	21	11	90	122
Conewago West	65	Musser Run	Manchester Boro	5	1,164	8	58	126	191	2	355	2	6	68	76
Yellow Breeches	91	Fishers Run	Monaghan	29	6,318	107	42	253	402	158	34,362	584	4	211	798
Yellow Breeches	104	Stony Run (East)	Monaghan	5	1,091	36	6	71	114	15	3,162	105	1	65	171
Yellow Breeches	91	Stony Run (West)	Monaghan	7	1,498	23	2	73	98	16	3,399	52	0	72	124
Codorus Creek SB	86	SB Codorus Creek	New Freedom Boro	7	1,549	41	91	177	309	9	1,903	50	9	87	145
Conewago West	9	Bennetts Run	Newberry	4	851	5	12	31	49	13	2,836	18	1	19	38
Susquehanna River	35	Fisher Cem. Trib	Newberry	3	606	3	7	15	25	18	3,889	20	1	8	28
Susquehanna River	11	Big Spring Run	Newberry	6	1,298	9	8	44	61	17	3,755	26	1	36	63
Susquehanna River	35	Yocumtown Trib	Newberry	8	1,815	25	37	52	114	11	2,401	33	4	15	52
Susquehanna River	35	Cartref Rd Trib	Newberry	21	4,664	135	50	186	370	16	3,585	103	5	136	245
Codorus Creek WB	92	Stoverstown Branch	North Codorus	1	239	3	4	12	19	110	23,866	298	0	8	306
Codorus Creek EB	6	Barshinger Creek	North Hopewell	2	339	12	6	25	43	20	4,379	155	1	18	174

PADEP IMPAIRED WATERS				POTENTIAL / TARGETED URBAN BMP SUBCATEGORIES FOR IMPAIRED WATERS						POTENTIAL /TARGETED AGRICULTURAL BMP SUBCATEGORIES FOR IMPAIRED WATERS					
Watershed	Impaired Subwatershed ID	Impaired Waterway*	Municipality	Urban Riparian Buffers (Ac) U-1	Urban Stream Restoration (LF) U-2	Urban Woodland Mgt. (Ac) U-3	Urban Impervious Cover (Ac) U-4	Urban Stormwater Mgt. (Ac) U-5	Urban Nutrient Mgt. (Ac) U-6	Agricultural Buffers (Ac) A-1	Riparian Restoration (LF) A-2	Agricultural Woodland Mgt.(Ac) A-3	Agricultural Impervious Cover (Ac) A-4	Agricultural Stormwater Mgt. (Ac) A-5	Agricultural Conservation (Ac) A-6
Muddy Creek NB	69	NB Muddy Creek	North Hopewell	1	158	1	3	6	10	12	2,612	20	0	3	24
Codorus Creek WB	72	Oil Creek	Paradise	0	0	0	0	0	0	0	0	1	0	0	1
Conewago West	21	Big Mount Trib	Paradise	1	153	2	5	14	21	52	11,398	133	0	10	143
Conewago West	8	Paradise Run	Paradise	7	1,607	28	44	92	164	164	35,726	618	4	48	670
Conewago West	8	Beaver Creek (W)	Paradise	4	879	29	24	50	103	49	10,704	350	2	26	378
Little Conewago	54	Canal Rd. Trib	Paradise	1	220	1	4	13	18	17	3,675	22	0	8	31
Little Conewago	54	Little Conewago	Paradise	4	967	18	24	71	113	60	13,099	250	2	46	299
Muddy Creek	84	Scott Creek	Peach Bottom	2	384	14	8	24	46	25	5,418	201	1	16	218
Codorus Creek WB	72	Oil Creek	Penn	86	18,779	133	471	745	1,348	139	30,179	213	47	274	534
Codorus Creek WB	40	Gitts Run	Penn	12	2,701	50	5	70	125	53	11,466	212	0	65	278
Conewago West	87	Adams-York Border Trib	Penn	0	9	0	0	0	0	21	4,561	1	0	0	1
Conewago West	87	Pigeon Hills Trib	Penn	22	4,878	40	191	134	364	49	10,760	87	19	-57	49
Conewago West	78	Plum Creek	Penn	14	3,093	1	69	141	211	4	843	0	7	71	79
Codorus Creek SB	86	SB Codorus Creek	Railroad Boro	6	1,242	14	12	34	61	30	6,509	74	1	22	96
Codorus Creek	62	Mill Creek	Red Lion Boro	0	0	6	85	87	178	0	0	0	9	2	11
Codorus Creek EB	6	Barshinger Creek	Red Lion Boro	0	0	5	47	80	132	0	0	2	5	33	40
Muddy Creek NB	76	Pine Run	Red Lion Boro	0	0	1	48	53	102	0	0	0	5	6	11
Susquehanna River	35	Fishing Creek (E)	Red Lion Boro	0	0	2	88	56	146	0	0	0	9	-31	-22
Codorus Creek EB	31	Seaks Run	Shrewsbury	0	0	1	7	6	14	0	0	4	1	0	4
Codorus Creek SB	18	Centerville Creek	Shrewsbury	2	451	13	7	25	44	61	13,377	383	1	18	402
Codorus Creek SB	36	Foust Creek	Shrewsbury	1	256	6	5	14	25	7	1,488	34	0	9	44
Codorus Creek SB	86	Glen Rock Valley Trib (S)	Shrewsbury	2	513	20	11	32	64	4	931	37	1	21	60
Codorus Creek SB	86	SB Codorus Creek	Shrewsbury	9	2,040	39	53	135	227	45	9,713	184	5	82	271
Deer Creek	55	Little Falls Creek	Shrewsbury	1	201	2	2	12	15	62	13,428	103	0	9	113
Codorus Creek SB	86	SB Codorus Creek	Shrewsbury Boro	0	0	0	12	38	50	0	0	1	1	27	28
Codorus Creek	62	Mill Creek	Spring Garden	63	13,667	59	376	471	906	8	1,686	7	38	95	140
Codorus Creek	20	Poorhouse Run	Spring Garden	10	2,141	4	212	342	557	1	219	0	21	130	151
Codorus Creek	20	Tyler Run	Spring Garden	20	4,277	90	168	347	605	10	2,111	44	17	178	240
Codorus Creek	20	Sherman St. Ext. Trib	Springettsbury	12	2,561	48	21	101	170	11	2,453	46	2	80	128
Codorus Creek	62	Mill Creek	Springettsbury	144	31,273	389	1,217	1,622	3,228	42	9,190	114	122	404	640
Kreutz Creek	50	Kreutz Creek	Springettsbury	55	12,057	265	267	564	1,097	42	9,050	199	27	297	523
Codorus Creek EB	31	Seaks Run	Springfield	3	580	7	27	23	58	20	4,435	57	3	-4	56
Codorus Creek SB	36	Foust Creek	Springfield	1	316	6	8	26	39	33	7,088	134	1	18	153
Deer Creek	26	Ebaughs Creek	Stewartstown Boro	4	779	7	40	84	131	6	1,262	11	4	44	59
Conewago West	8	Beaver Creek (N)	Warrington	44	9,691	387	72	453	911	127	27,752	1,107	7	382	1,496
Conewago West	68	NB Bermudian Creek	Warrington	5	1,040	14	10	49	73	37	8,137	111	1	40	152
Conewago West	68	NB Bermudian Creek	Washington	11	2,494	12	35	92	140	185	40,337	202	3	57	263
Conewago West	10	Bermudian Creek	Washington	4	837	2	14	38	54	32	7,030	16	1	24	42
Conewago West	63	Mud Run	Washington	3	612	9	6	20	34	55	11,927	171	1	14	186
Conewago West	21	Bermudian Church Rd Trib	Washington	1	254	4	0	15	20	30	6,503	115	0	15	129
Conewago West	21	Eisenharts Mill Trib	Washington	1	145	1	3	8	12	35	7,536	59	0	6	65
Codorus Creek	101	Willis Run	West Manchester	62	13,610	33	548	691	1,272	9	2,051	5	55	143	203
Codorus Creek	20	Hokes Mill Trib	West Manchester	40	8,613	108	587	698	1,393	48	10,422	131	59	112	301
Little Conewago	54	Little Conewago	West Manchester	97	21,176	112	543	1,332	1,987	54	11,780	63	54	788	905
Little Conewago	45	Honey Run	West Manchester	15	3,306	36	19	335	390	16	3,429	37	2	316	355
Codorus Creek	20	Hokes Mill Trib	West York	0	0	1	114	81	196	0	0	0	11	-34	-22
Codorus Creek EB	6	Barshinger Creek	Windsor	0	0	3	8	26	38	0	0	3	1	18	21
Kreutz Creek	50	Kreutz Creek	Windsor	7	1,430	26	55	150	231	8	1,800	33	6	95	133
Muddy Creek NB	76	Pine Run	Windsor	9	1,892	42	50	94	187	109	23,792	534	5	44	584
Muddy Creek NB	69	NB Muddy Creek	Windsor	2	386	8	8	24	40	35	7,728	155	1	16	171
Susquehanna River	35	Fishing Creek (E)	Windsor	8	1,732	70	80	245	396	36	7,830	318	8	165	491
Susquehanna River	35	Fishing Creek (E)	Windsor Boro	11	2,375	13	33	77	123	11	2,380	13	3	45	61
Codorus Creek	62	Mill Creek	Yoe Boro	9	1,968	10	34	65	108	2	452	2	3	31	37
Codorus Creek	62	Mill Creek	York	103	22,362	323	576	1,081	1,980	192	41,919	606	58	505	1,168
Codorus Creek	20	Tyler Run	York	59	12,876	121	339	671	1,131	36	7,777	73	34	332	439
Codorus Creek	20	Imperial Dr. Trib	York	15	3,298	41	69	196	307	25	5,357	67	7	127	201
Codorus Creek	6	Barshinger Creek	York	25	5,439	78	80	193	351	129	28,085	401	8	113	522
Codorus Creek EB	31	Inners Creek	York	29	6,274	96	118	342	555	64	13,924	212	12	224	448
Kreutz Creek	50	Kreutz Creek	York	0	0	0	2	7	9	0	0	0	0	4	4
Muddy Creek NB	69	NB Muddy Creek	York	0	0	0	1	5	6	0	0	0	0	4	4
Codorus Creek	20	Lightners School Trib	York City	0	0	0	6	6	11	0	0	0	1	0	1
Codorus Creek	101	Willis Run	York City	40	8,673	24	415	515	954	11	2,486	7	42	100	148
Codorus Creek	20	Poorhouse Run	York City	42	9,242	23	497	300	821	4	910	2	50	-197	-145
Codorus Creek	20	Tyler Run	York City	10	2,184	3	124	134	262	0	7	0	12	10	23
		SUBTOTAL		1,901	414,370	6,507	11,899	23,001	41,408	5,396	1,175,106	21,055	2,968	11,102	35,125

* Unnamed tributaries were given a name by the Coalition to assist users in determining their location

** The BMP lineal feet and acreage numbers that appear on this Table are for general information and planning purposes only. The Program that was used to produce the numbers is only as good as the data that was entered into it. The Coalition does not guarantee its accuracy.

APPENDIX F

Resources

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RESOURCES

Financial, Technical, and Other Assistance

Considerable effort may be required to obtain funding for stormwater management planning and implementation projects. The following resources are intended to assist stakeholders with obtaining financial, technical, and other assistance. It is often advantageous to seek several diverse sources to finance a project.

LOCAL RESOURCES

York County - Community Development Block Grant (CDBG) Funding

The US Department of Housing and Urban Development (HUD) provides annual Community Development Block Grants (CDBG) on a formula basis to entitlement cities and counties to develop viable urban communities by providing decent housing and a suitable living environment and by expanding economic opportunities, principally for low- and moderate-income persons. York County has been an entitlement community since 1977 and has received an annual allocation of funds since that time.

The York County CDBG Program is administered by the York County Planning Commission (YCPC). A "Notice of Request for Projects for the CDBG Program" is issued every three years, resulting in a CDBG Three Year Project Plan, followed by Annual Action Plans.

Public facility and planning activities are among the eligible activities. Public facilities include, but are not limited to construction and reconstruction of public facilities and improvements, such as water and sewer facilities, streets, curbs, sidewalks, and neighborhood centers. Funded projects have included an array of water management activities (flood prevention, storm/road drainage improvements, and bridge/culvert replacements). Maintenance activities are not fundable. Planning activities include comprehensive plans; sewage facility plans; community development plans, studies and strategies; and action programs to implement plans, such as development of codes, ordinances, and regulations. Public facilities activities must either principally benefit low-and moderate-income persons or eliminate slums and blight to be funded. Applicants for planning activities are encouraged to demonstrate a benefit to low- and moderate-income persons, but it is not required.

For more information, please contact the YCPC Housing and Community Development Division at (717) 771-9870 or visit the YCPC website at www.ycpc.org.

York County – Conservation and Recreation Funding

The County of York receives an annual allocation from a special Pennsylvania Marcellus Shale Legacy Fund established by Act 13 of 2012 and the funds received must be used for conservation and recreation projects. The monies in the State Legacy Fund result from impact fees paid by natural gas drillers. Since the amount of impact fees collected by the State varies from year to year, the County's allocation likewise varies.

Funds may be used for planning, land acquisition, development, rehabilitation and repair related to greenways, recreational trails, open space, natural areas, community conservation and beautification projects, community and heritage parks, and water resource management projects.

For more information, contact the York County Board of Commissioners Office at (717) 771-9964.

York County Community Foundation (YCCF) – Codorus Watershed Endowment

The Codorus Watershed Endowment is a fund within the Environmental Field of Interest at the YCCF that promotes awareness, protection and conservation of natural resources within the Watershed. The Endowment was created in December, 2001, with YCCF's receipt of a \$2 million gift from Glatfelter of Spring Grove, PA., as part of a consent decree settling litigation.

Who is eligible: local not-for-profit and/or governmental agencies.

Eligible proposals must advance the Endowment's goals to protect and improve the watershed over time. Grants are awarded in response to a competitive application process.

For more information, contact the YCCF at (717) 848-3733 or email info@yccf.org

STATE RESOURCES: Grants, Loans, Rebates & Technical Assistance

PA Department of Environmental Protection (DEP)

DEP has dozens of grants and loans, as well as rebates, to assist individuals, groups and businesses with a host of environmental issues. Click the links below to view a list of available grants, loans and rebates, a description of each program, links to applications and eligibility information.

DEP's Grants Center is available to assist you with general questions. Contact 717-705-5400 or email [DEP Grants and Loans](#) for more information.

Welcome to DEP's Grant and Loan Programs Center. Providing grants and loans to assist individuals, groups and businesses in addressing a host of environmental issues is a key part of DEP's mission to protect and enhance Pennsylvania's natural resources. Below is a list of available grants and loans, a description of each program, links to applications and eligibility information. If there is no application document listed, then the grant is currently unavailable.

DEP's Grants Center is available to assist with any general questions. For more information, contact 717-705-5400.

Dirt and Gravel Road Maintenance Program

The Dirt and Gravel Road Maintenance Program provides an annual \$5 million in funding to reduce sediment pollution and runoff from Pennsylvania's 20,000+ miles of unpaved public and Bureau of Forestry roads. The funding comes from the Pennsylvania State Conservation Commission and Pennsylvania Bureau of Forestry. The public program is administered by Pennsylvania's network of 66 county conservation districts (CCD).

Who is eligible: Public road-owning entities, such as townships, are eligible to apply and should apply to their local CCD to receive funding for individual road projects.

<http://www.dirtandgravel.psu.edu/>

Enactment of Ordinances and Implementation of Stormwater Management Plans

Grants are available to reimburse municipalities for costs incurred in the adoption or revision of ordinances or regulations and other administrative, enforcement, and implementation costs incurred in complying with the Pennsylvania Stormwater Management Act, Act 167, and the companion regulation governing stormwater management grants and reimbursements. There is currently no appropriation for this program; however, applications submitted will be held in the event funding is made available.

Who is eligible: Municipalities.

http://www.depweb.state.pa.us/portal/server.pt/community/stormwater_management/10628

Environmental Education Grants Program

The Environmental Education Grants Program (EE Grant Program) was developed to support and strengthen environmental education in Pennsylvania. The EE Grants were established by the Environmental Education Act of 1993 and mandate that five

percent of all pollution fines and penalties DEP collects annually be set aside for environmental education.

Who is eligible: Public and private schools, colleges and universities, county conservation districts, nonprofit organizations and associations, conservation and education organizations, municipalities, municipal authorities and businesses.

http://www.depweb.state.pa.us/portal/server.pt/community/environmental_education/6013

Growing Greener Watershed Protection Grants

The Growing Greener Watershed Grants provides nearly \$547 million in funding to clean up non-point sources of pollution throughout Pennsylvania. Examples of projects include acid mine drainage abatement, mine cleanup efforts, abandoned oil and gas well plugging and local watershed-based conservation projects. The grants were established by the Environmental Stewardship and Watershed Protection Act.

Who is eligible: Counties, authorities and other municipalities; county conservation districts; watershed organizations; and other organizations involved in the restoration and protection of Pennsylvania's environment.

http://www.depweb.state.pa.us/portal/server.pt/community/growing_greener/13958

Household Hazardous Waste Collection Grant Program

Grants are available to registered sponsors of collection programs for household hazardous waste (HHW), electronics, and tires (but not tire pile cleanups). Reimbursement is available for up to 50 percent of eligible costs, but not exceeding \$100,000 per county. Eligible costs typically include collection, transportation and management of the wastes plus education programs.

Who is eligible: Municipalities that register a HHW program with DEP is eligible to apply for reimbursement.

<http://www.depreportingservices.state.pa.us/ReportServer/Pages/ReportViewer.aspx?%2fGrants%2fGrantLoans>

Municipal Recycling Program Grants

The Municipal Recycling Program Grants were developed to assist municipalities and counties for developing and implementing recycling programs. Recycling is mandated in municipalities with more than 10,000 residents and those with populations between 5,000 and 10,000 that have population densities greater than 300 people per square mile.

Who is eligible: Through the grant program, municipalities and counties in Pennsylvania are eligible for up to 90 percent funding of approved recycling program

costs. Municipalities that are designated financially distressed under the Financial Distressed Communities Act are eligible to receive funding for an additional 10 percent of approved costs.

<http://www.portal.state.pa.us/portal/server.pt?open=514&objID=589534&mode=2>

Nonpoint Source Implementation Program Grants (Section 319)

This grant program provides funding to assist in implementing Pennsylvania's Nonpoint Source Management Program. This includes funding for abandoned mine drainage, agricultural and urban run-off, and natural channel design/streambank stabilization projects.

Who is eligible: Counties, municipalities, authorities, school districts, nonprofits, conservation districts and watershed groups.

http://www.portal.state.pa.us/portal/server.pt/community/nonpoint_source_management/10615

Nonpoint Source Pollution Educational Mini-Grants (PACD)

The Nonpoint Source Educational Mini-Grants were created for the purpose of informing and educating people about the causes, consequences and clean-up of nonpoint source water pollution.

Who is eligible: Conservation districts.

<http://pacd.org/education/nps-section-319-education-office/2012-13npsgrants/>

Sewage Facilities Enforcement and Permitting Grants

The Sewage Facilities Enforcement Grants provides for reimbursement of 50 to 85 percent of costs of on-lot system permitting programs. There currently is no appropriation for this program. However, applications submitted are held for the fiscal year in the event funding is made available. If at the end of the fiscal year funding has not been made available, the applications are no longer valid.

Who is eligible: Counties, municipalities and groups of municipalities.

http://www.portal.state.pa.us/portal/server.pt/community/sewage_and_disposal/10583

Sewage Facilities Planning Grants

The Sewage Facilities Planning Grants reimburses up to 50% of the activities and studies related to the development of comprehensive sewage facilities plans. There currently is no appropriation for this program. However, any applications submitted will be held in the event funding is made available.

Who is eligible: Counties, municipalities and authorities.

http://www.portal.state.pa.us/portal/server.pt/community/sewage_and_disposal/10583

Small Business Pollution Prevention Assistance Account (PPAA) Loan Program

The loan program provides low interest loans to small-businesses in Pennsylvania undertaking projects in Pennsylvania that reduce waste, pollution or energy use. Loans will be used to fund 75 percent of the total eligible project cost, up to a maximum of \$100,000.

Who is eligible: Small businesses within Pennsylvania.

<http://www.portal.state.pa.us/portal/server.pt?open=514&objID=553247&mode=2>

Watershed Education Grants

Through the Water Resources Education Network (WREN) Project, the League of Women Voters of Pennsylvania Citizen Education Fund accepts proposals for watershed education projects sponsored by community based partnerships that educate, build awareness, and promote water-sustaining public policies and/or behavior change. Projects should be designed to encourage individual or collective action that will protect and improve local water resources.

Who is eligible: Counties, municipalities, authorities, school districts, nonprofits, conservation districts and other entities are eligible.

<http://wren.palwv.org/grants/local.html>

PennVEST

Since its inception, PENNVEST has continued its service to the communities and citizens of Pennsylvania by funding sewer, storm water and drinking water projects throughout the Commonwealth. These projects not only contribute to improving Pennsylvania's environment and the health of its people, they also provide opportunities for economic growth and jobs for Pennsylvania's workers. With regard to funding for storm water management and Best Management Practice (BMP) projects through PENNVEST, previously only governmental units could qualify for financial assistance, but now, private entities may also qualify for project funding so long as the project

meets applicable requirements, including compliance with the ordinances, policies, and plans adopted by the municipality where the project is to be located.

PENNVEST's low cost financial assistance helps make the water that is consumed every day by thousands of Pennsylvanians safe to drink. It helps clean rivers and streams in communities for the enjoyment of our citizens and the protection of our natural resources. PENNVEST funding also assists businesses to locate and expand their operations in Pennsylvania to create permanent, well-paying jobs for our workers. All of us at PENNVEST are committed to working harder and smarter for the citizens of our Commonwealth. We are working with the public and job creators to achieve both environmental improvements and economic development. We continually seek ways to make these twin goals compatible, to work together for the common good of all Pennsylvanians.

Through the financing we offer, PENNVEST represents an important part of Pennsylvania's environmental improvement and economic development efforts. With every loan that we approve, we show in very concrete terms how these goals can work side-by-side for the betterment of Pennsylvania and the improvement of our lives and those of our children.

http://www.pennvest.state.pa.us/portal/server.pt/community/about_us/9320

Commonwealth Financing Authority (CFA)

<http://newpa.com/find-and-apply-for-funding/commonwealth-financing-authority>

The Commonwealth Financing Authority (CFA) was established as an independent agency of the Commonwealth to administer Pennsylvania's economic stimulus packages. The CFA holds fiduciary responsibility over the funding of programs and investments in Pennsylvania's economic growth.

H2O PA - Water Supply, Sanitary Sewer and Storm Water Projects

Download the guidelines for a complete understanding of the program and the requirements.

[Download Guidelines](#)

Overview - The H2O PA Act was established by the General Assembly in July 2008. The Act provides for single-year or multi-year grants to municipalities or municipal authorities to assist with the construction of drinking water, sanitary sewer and storm sewer projects.

ACT 13 Marcellus Legacy Fund Programs

[Watershed Restoration Protection Program](#)

On January 29, 2013, the Commonwealth Financing Authority (CFA) Board of Directors approved a motion to accept applications requesting funding under the Watershed Restoration Protection Program which provides grants to restore and maintain stream reaches impaired by the uncontrolled discharge of nonpoint source polluted runoff and ultimately to remove these streams from the Department of Environmental Protection's Impaired Waters list.

[Baseline Water Quality Data Program](#)

On January 29, 2013, the Commonwealth Financing Authority (CFA) Board of Directors approved a motion to accept applications requesting funding under the Baseline Water Quality Data Program which provides grants to use the scientific principles and practices for water sample collection and analysis to document existing groundwater quality conditions on private water supplies.

[Greenways, Trails and Recreation Program](#)

On January 29, 2013, the Commonwealth Financing Authority (CFA) Board of Directors approved a motion to accept applications requesting funding under the Greenways, Trails and Recreation Program which provides grants for the planning, acquisition, development, rehabilitation and repair of greenways, recreational trails, open space, parks and beautification projects.

[Orphan or Abandoned Well Plugging Program](#)

On January 29, 2013, the Commonwealth Financing Authority (CFA) Board of Directors approved a motion to accept applications requesting funding under the Orphan or Abandoned Well Plugging Program, which provides grants to provide mechanisms to plug abandoned and orphaned wells that have the potential to cause health, safety or environmental concerns.

[Flood Mitigation Program](#)

The Commonwealth Financing Authority (CFA) Board of Directors approved a motion to accept applications requesting funding under the Flood Mitigation Program which provides grants to assist with flood mitigation projects.

The Act 13 Marcellus Legacy Fund applications for consideration at the November 13, 2013 meeting will be accepted through July 31, 2013. Eligible applicants are encouraged to contact Brian Eckert or Matthew Karnell at 717-787-6245 to discuss potential projects before commencing the application process.

[PennWorks](#)

On January 29, 2013, the Commonwealth Financing Authority (CFA) Board of Directors approved a motion to accept applications requesting funding under the [PennWorks](#) program for water and sewer projects not used solely for residential purposes. Applications for consideration at the September 17, 2013 meeting will be accepted

through June 28, 2013. Eligible applicants are encouraged to contact Brian Eckert or Matthew Karnell at 717-787-6245 to discuss potential projects before commencing the application process.

PA Department of Community & Economic Development (DCED)

Programs, Loans, Tax Credits and Grants: If you're seeking funding for a business venture, a community project or site revitalization in Pennsylvania, the Funding & Program Finder puts the information you need right at your fingertips.

<http://www.newpa.com/find-and-apply-for-funding/>

PA Department of Conservation & Natural Resources (DCNR)

The DCNR Bureau of Recreation and Conservation (BRC) builds connections between the citizens and the outdoors through recreation enhancement, natural resources conservation and community revitalization efforts. BRC partners with communities and organizations across Pennsylvania to provide technical assistance and financial support for these efforts.

Information on grants and technical assistance resources available through the BRC can be found on the "grants" page of the Departments website.

www.dcnr.state.pa.us/brc/grants/index.aspx

Additional information on environmental grants is available through the Environmental eGrants System / eGrant Program Opportunities webpage listed below. For eGrants customer service call 1-800-326-7734 or send email to DCNR-Grants@pa.gov.

www.grants.dcnr.state.pa.us/GrantPrograms.aspx

The BRC has also developed a *Funding Guide for Recreation and Conservation Projects* to assist communities and organizations interested in pursuing funding for their community recreation and conservation projects. The Guide includes information on a variety of State and Federal funding resources, as well as private and non-profit organization resources.

Click on the *Additional Funding Sources* link on the Resources and Technical Assistance webpage listed below to view or print a copy of the Funding Guide.

www.dcnr.state.pa.us/brc/elibrary/resourceta/index.htm

DCNR - Community Recreation and Conservation Program (C2P2)

C2P2 grants are awarded to municipalities and authorized nonprofit organizations for recreation, park, trail and conservation projects. These include planning for feasibility studies, trail studies, conservation plans, master site development plans, and comprehensive recreation, park and open space and greenway plans; land acquisition for active or passive parks, trails and conservation purposes; and new development and rehabilitation of parks, trails and recreation facilities. Most projects require a 50% match, which can include a combination of Cash and/or Non-Cash values.

Who is eligible: County or Municipal Government, Higher Educational Institution, Other Educational Institution, Non-profit with 501(c)3 IRS Status and Non-profit with PA Bureau of Charitable Organizations Status.

After you've identified a project, download the C2P2 eGrants Application [Step-By-Step Instructions](#) for reference when completing the application.

PA Emergency Management Agency (PEMA)

PEMA administers five mitigation grant programs for the Federal Emergency Management Agency (FEMA) under the umbrella of **Hazard Mitigation Assistance**:

- Hazard Mitigation Grant Program (HMGP)
- Flood Mitigation Assistance (FMA) program
- Pre-Disaster Mitigation (PDM) program
- Repetitive Flood Claims (RFC) program
- Severe Repetitive Loss (SRL) program

Each fiscal year (on or around June 1), FEMA releases unified guidance for all five of the HMA programs. Hazard Mitigation Assistance Unified Guidance can be found on the [Hazard Mitigation Forms Page](#).

While the goals and types of projects for these programs are similar, there are important differences in eligibility and application procedures. Applicants for any of these grant programs must have a FEMA-approved Hazard Mitigation Plan to be eligible for funding. Below is a brief summary of each program.

Additional information on PEMA grant resources can be obtained by contacting Tom Hughes at thughes@pa.gov or by phone: 717-651-2726. Information is also available on the Grants Management Program page of PEMA's website:

http://www.pema.state.pa.us/portal/server.pt/community/programs_and_services/4547/grant_management_programs/458184.

Hazard Mitigation Grant Program (HMGP)

The HMGP is a post-disaster mitigation program. It is made available to states by FEMA after each Federal disaster declaration. The HMGP can provide up to 75% funding for hazard mitigation measures. The HMGP's objective is to support cost-effective measures implemented during the recovery from a disaster that will reduce the risk of damage and suffering from future disasters.

The HMGP can be used to fund cost-effective projects that will protect public or private property in an area covered by a Federal disaster declaration. Projects must fit into an overall mitigation strategy for the area identified as part of a local planning effort. Applications must demonstrate a need for the proposed project and the potential to provide a long-term solution to problems that are repetitive or pose a significant threat to public health and safety if left unresolved. Examples of fundable projects include: acquisition and demolition of structures in hazard prone areas; flood proofing or elevation to reduce future damage; minor structural improvements; and development of state or local standards. HMGP funds may not be used for disaster repairs, since other Federal programs support these.

Who is eligible: state and local governments and certain private non-profit organizations or institutions that perform essential government services. Individuals or homeowners cannot apply directly for the HMGP; a local government must apply on their behalf.

Flood Mitigation Assistance Program (FMAP)

The Flood Mitigation Assistance Program (FMAP) is a pre-disaster mitigation program. FMAP is funded annually; a federal disaster declaration is not required. FMAP funding comes from the National Flood Insurance Program (NFIP). Only NFIP-insured homes and businesses are eligible for mitigation in this program. Funding for the FMAP is very limited. Applications for the FMAP are done electronically through FEMA's e-Grants System. The federal cost share for an FMAP project is 75 percent. At minimum, a FEMA-approved local flood mitigation plan is required before a project can be approved. Some funding is available for planning.

Who is eligible: local governments or other eligible organizations; individuals cannot apply directly for the program.

Pre-Disaster Mitigation Program (PDM)

The Pre-Disaster Mitigation Program (PDM) is an annually funded nationwide competitive grant program; a federal disaster declaration is not required. Applications for the FMAP are done electronically through FEMA's e-Grants System. The federal cost share for an FMAP project is 75 percent. At minimum, a FEMA-approved local flood mitigation plan is required before a project can be approved. Some funding is available for planning.

Because PDM is a nationwide program, applications from across the United States compete for available funds. The information required to compete a PDM application can be extensive because of the level of competition for funds. PEMA mitigation staff are available to assist local applicants with those demands and completing their e-Grant applications.

Who is eligible: local governments or eligible organizations; individuals cannot apply directly for the program.

Repetitive Flood Claims Program (RFC)

The Repetitive Flood Claims Program (RFC) is an annually funded competitive grant program; a federal disaster is not required. Only mitigation projects for acquisition of insured properties that have one or more claim payments for flood damages, and either demolition or relocation of structures, with conversion of property to deed restricted open space uses are eligible. Applications for RFC are done electronically through FEMA's e-Grants System. The federal cost share for an RFC project is 100 percent, if local governments can certify that they do not have the management capacity and that non-federal cost share funds are not available. At minimum, a FEMA-approved all hazard mitigation plan is required before a project can be approved.

Because RFC is a nationwide program, applications from across the United States compete for available funds. The information required to compete an RFC application can be extensive because of the level of competition for funds. PEMA mitigation staff are available to assist local applicants with those demands and completing their e-Grant applications.

Who is eligible: local governments or eligible organizations; individuals cannot apply directly for the program.

Severe Repetitive Loss Program (SRL)

The Severe Repetitive Loss Program (SRL) is an annually funded competitive grant program; a federal disaster is not required. Eligible mitigation projects include acquisition (buyout), relocation, elevation of insured properties and minor flood control projects. Properties must meet the following criteria, be selected by NFIP to be eligible, and appear on the SRL validated list to participate in the program: 4 claims of \$5,000 or more within past 10 years, or 2 claims totaling 100% of the cost of the structure within the past 10 years

Applications for SRL are done electronically through FEMA's e-Grants System. The federal cost share for an SRL project is 90 percent. At a minimum, a FEMA-approved all hazard mitigation plan is required before a project can be approved.

SRL is a nationwide program; applications from across the United States compete for available funds. The information required to compete a SRL application can be

extensive because of the level of competition for funds. PEMA mitigation staff is available to assist local applicants with those demands and completing their e-Grant applications.

Who is eligible: local governments or eligible organizations; individuals cannot apply directly for the program.

FEDERAL RESOURCES

USEPA – Nonpoint Source-Related Funding Opportunities

Information Resources and Centers

- [Watershed Funding Information](#)
A hub for tools, databases and information about sources of funding to practitioners and funders that serve to protect watersheds.
- [Catalog of Federal Funding Sources for Watershed Protection](#) (Searchable Database)
A searchable database of financial assistance sources (grants, loans, cost-sharing) available from federal agencies to fund a variety of watershed protection projects.
- [Capacity Building Resources](#)
This Nonpoint Source Capacity Building and Funding Workgroup Web site provides scientific, legal, outreach, planning, and engineering resources and tools.
- [Financing Stormwater Management](#)
This site includes an annotated bibliography of existing stormwater finance materials; an archive that contains selected previously published materials concerning stormwater finance; a manual that discusses the financing options available to communities for stormwater management programs.
- [Office of Wastewater Management Financial Assistance](#)
This page provides links to funding programs including the Drinking Water State Revolving Fund and the Environmental Finance Program.
- [Nonpoint Finance Project](#)
The Northeast-Midwest Institute and the Marine Studies Consortium have launched a Nonpoint Finance Project that seeks to identify innovative ways to finance nonpoint source pollution reduction.

Clean Water State Revolving Fund

- [Funding Nonpoint Source Activities with Clean Water State Revolving Fund \(PDF\)](#) (24 pp, 266K [About PDF](#))
This guidance provides detailed information on the Clean Water State Revolving Fund including explanations of the funding breakdown, the program's history and state agency contact information (November 2003, EPA 832-F-03-009).
- [Cleaning Up Polluted Runoff with the Clean Water State Revolving Fund \(Fact Sheet\) \(PDF\)](#) (4 pp, 722K)
This fact sheet provides background information on the CWSRF (March 2003, EPA 832-F-03-0004).

Clean Water Act Section 319 Funding

319 funding made it possible for landowners in Alabama to construct alternative watering sources at eight different locations to limit cattle's access to creeks.

- [Process for Applying for 319\(h\) Funds](#)
This page provides background information on securing 319(h) funds.
- [Clean Water Act Section 319\(h\) Grant Funding History](#)
Table listing grant funding totals starting in 1990.
- [Applying for and Administering CWA Section 319 Grants: A Guide for State Nonpoint Source Agencies \(March 2003\)](#)
This manual provides an overview of federal grant requirements that will guide state and territory nonpoint source agency staff when applying for and administering grants awarded under the Clean Water Act Section 319.
- [Clean Water Act Section 319](#)
More information on Section 319 grants.

Guides and Reports

- [Nonpoint Source Minigrants \(May 2001\) \(PDF\)](#) (38 pp, 93K)
This report from May 2001 describes mini-grants programs used by various states, local agencies, and non-profit organizations to implement efforts to address nonpoint source pollution and to protect or restore watersheds. Many of these are implemented as sub-awards, through state grant or contract mechanisms, of funds received by the state as part of an EPA grant under Section 319 of the Clean Water Act. Others are purely state-funded. In addition, the report closes with some examples of similar mini-grants used by estuary programs in the National Estuary Program under Section 320 of the CWA. The report is a product of the Grants Workgroup of the state-EPA Nonpoint Source Partnership.

- [Environmental Finance Program - A Guidebook of Financial Tools](#)
This Guidebook is intended to be a working tool to enable practitioners in the public and private sector to find the appropriate methods to pay for environmental protection efforts. The Guidebook does not explain how or where to apply for nonpoint source related grants.
- [A State and Local Government Guide to Environmental Program Funding Alternatives](#)
This document provides an overview of traditional (nongovernmental) funding mechanisms and innovative approaches for funding environmental programs (January 1994, EPA 841-K-94-0001).

USEPA - Green Infrastructure

<http://water.epa.gov/infrastructure/greeninfrastructure/index.cfm>

Cost-Benefit Resources

A growing number of tools are available to conduct cost benefit analyses of green infrastructure approaches. Completed analyses demonstrate that the value of green infrastructure benefits can exceed those of gray.

[Learn More](#)

Funding Opportunities

Because green infrastructure serves many purposes, from community revitalization to habitat protection, project sponsors can tap a variety of federal funding sources.

[Learn More](#)

Policy Guides

Local governments can choose from a variety of policy and planning strategies to encourage or require green infrastructure.

[Learn More](#)

Design and Implementation Resources

Green infrastructure is most effective when the design is tailored to the context, when the installation follows the design, and when routine maintenance is performed.

[Learn More](#)

Modeling Tools

Modeling tools to assess the performance, costs, and benefits of green infrastructure are available at a range of scales.

[Learn More](#)

Federal Regulatory Programs

EPA encourages the use of green infrastructure in stormwater permits and Combined Sewer Overflow (CSO) enforcement agreements.

[Learn More](#)

USEPA – Funding Green Infrastructure

http://water.epa.gov/infrastructure/greeninfrastructure/gi_funding.cfm

This section lists potential federal funding sources for green infrastructure projects. State websites should also be consulted for information on state funding programs.

[EPA Clean Water Act Nonpoint Source Grant \(Section 319 Grants\)](#) - Congress amended the Clean Water Act in 1987 to establish EPA's Section 319 Nonpoint Source Management Program because it recognized the need for greater federal leadership to help focus state and local nonpoint source efforts. Under Section 319, states, territories, and Indian tribes receive grant money which supports a wide variety of activities including technical assistance, financial assistance, education, training, technology transfer, demonstration projects, and monitoring to assess the success of projects that have been implemented.

[EPA Clean Water State Revolving Fund \(CWSRF\)](#) - EPA's CWSRF program has provided more than \$4.5 billion annually in recent years to fund water quality protection projects for wastewater treatment, stormwater management, nonpoint source pollution control, and watershed and estuary management. View the CWSRF document: [Green Infrastructure Approaches to Managing Wet Weather with Clean Water State Revolving Funds \(PDF\)](#) (6 pp, 458K).

[EPA Community Action for a Renewed Environment \(CARE\) Grants](#) - The U.S. EPA CARE Cooperative Agreement Request for Proposals (RFP) supports community-based partnerships to reduce pollution at the local level. Eligible applicants include county and local governments, tribes, non-profit organizations, and universities.

[EPA Office of Wetlands, Oceans, and Watersheds \(OWOW\) Funding](#) - OWOW has created this website to provide tools, databases, and information about sources of funding to practitioners and funders that serve to protect watersheds.

National Park Service

[DOI Rivers, Trails, and Conservation Assistance Program](#) – The mission of the National Park Service's Rivers, Trails and Conservation Assistance program (RTCA) is to assist community-led natural resource conservation and outdoor recreation initiatives. RTCA staff provides guidance to communities so that they can conserve waterways, preserve open space, and develop trails and greenways.

Federal Highway Administration (DOT)

[DOT Transportation Enhancement Activities](#) – The Federal Highway Administration’s Transportation Enhancement (TE) activities offer funding opportunities to help expand transportation choices and enhance the transportation experience through [12 eligible TE activities](#) related to surface transportation, including pedestrian and bicycle infrastructure and safety programs, scenic and historic highway programs, landscaping and scenic beautification, historic preservation, and environmental mitigation. These activities could include green to mitigate the impacts of stormwater runoff.

US Economic Development Administration (EDA)

[EDA Funding Opportunities](#) - The U.S. Economic Development Administration (EDA) provides grants to support a range of business and industrial development activities that create or retain jobs, including infrastructure development. EDA also capitalizes Revolving Loan Funds to encourage new business development activity in economically distressed communities.

US Department of Housing & Urban Development (HUD)

[HUD Community Development Block Grant Program](#) - The Community Development Block Grant (CDBG) program is a flexible program that works to ensure decent affordable housing, provide services to the most vulnerable in our communities, and create jobs through the expansion and retention of businesses. CDBG-financed projects could incorporate green infrastructure into their design and construction. Chicago, for example, has used CDBG to put a new green roof on its historic Cultural Center.

[HUD Section 108 Loan Guarantee Program](#) – The Section 108 Loan Guarantee Program allows future Community Development Block Grant (CDBG) allocations to be used to guarantee loans for neighborhood revitalization projects, including construction or installation of public facilities and infrastructure. Section 108-guaranteed projects could incorporate green infrastructure into their design and construction.

[HUD Sustainable Communities Regional Planning Grants](#) - The Department of Housing and Urban Development’s Sustainable Communities Regional Planning Grant Program supports metropolitan and multijurisdictional planning efforts that integrate housing, land use, economic and workforce development, transportation, and infrastructure investments in a manner that empowers jurisdictions to consider the interdependent challenges of: (1) economic competitiveness and revitalization; (2) social equity, inclusion, and access to opportunity; (3) energy use and climate change; and (4) public health and environmental impact.

[NOAA Community Based Restoration Program](#) - The NOAA Community-Based Restoration Program began in 1996 to inspire and sustain local efforts to conduct coastal habitat restoration. Since then, the program has funded more than 1,500 projects in the United States, Canada, the Caribbean, and the Pacific Islands. These

projects have restored more than 41,000 acres of habitat and opened more than 1,700 stream miles for fish passage, while encouraging communities to actively participate in the conservation of our nation's coastal habitats.

US Department of Agricultural (USDA)

[USDA National Urban and Community Forestry Program](#) - The US Forest Service's National Urban and Community Forestry Program seeks to establish sustainable community forests that improve the public's health, well being, and economic vitality, and create resilient ecosystems for present and future generations. When funds are available, the program offers cost-share grants to support urban and community forestry projects that have national or multi-state application and impact.

[Rural Development Water and Environmental Programs](#) - The Department of Agriculture's Water and Environmental Programs provide loans, grants, and loan guarantees for drinking water, sanitary sewer, solid waste, and storm drainage facilities in rural areas and cities and towns with populations of 10,000 or less.

[Rural Development Community Facilities Loans and Grants](#) - The Department of Agriculture's Community Programs provide loans and grants and loan guarantees for water and environmental projects, as well as community facilities projects. Water and environmental projects include water systems, waste systems, solid waste, and storm drainage facilities. Community facilities projects develop essential community facilities for public use in rural areas and may include hospitals, fire protection, safety, as well as many other community-based initiatives.

Federal Tax Incentive Programs

Some tax incentive programs administered by federal agencies can be used to attract financing to green infrastructure projects. Below are two examples of programs whose missions are broad enough to support green infrastructure projects.

- Department of Energy administers a range of [energy efficiency tax incentives](#), and green infrastructure could be integrated into project design to claim the incentive. An example of how this might work is found in Oregon's Energy Efficiency Construction Credits. In Eugene, Oregon, a new biofuel station built on an abandoned gas station site included a green roof, bioswales and rain gardens. In this case, nearly \$250,000 worth of tax credits reduced income and sales tax for the private company that built and operated the project.
- Department of Treasury administers the multi-billion dollar [New Markets Tax Credit program](#), which encourages private investment for a range of project types (typically real estate or business development projects) in distressed areas. Awards are allocated to non-profit and private entities based on their proposals for distributing these tax benefits.

Guidance, Case Studies & Training Materials

To assist local stormwater managers in understanding the many available funding options for local stormwater programs, several government and non-profit organizations have developed comprehensive guides, case studies, and training materials. This section provides links to some of these resources, as well as links to spreadsheet tools designed to assist stormwater managers in assessing program costs and financing scenarios.

[EPA's Municipal Handbook: Funding Options \(PDF\)](#) (16 pp, 558K) (833-F-08-007) - This chapter of EPA's Municipal Handbook identifies and discusses two of the most common funding options that communities are using to fund green infrastructure - stormwater fees and loan programs.

[EPA's Municipal Handbook: Incentive Mechanisms \(PDF\)](#) (35 pp, 1.8MB) (833-F-09-001) – Green infrastructure on private property can significantly reduce the public cost of stormwater management. This chapter of the handbook describes a number of incentives that municipalities can offer to promote the implementation of green infrastructure on private properties and reduce their stormwater management costs.

[EPA Region 3 - Funding Stormwater Programs \(PDF\)](#) (5 pp, 403K) - This fact sheet supplements a review of common stormwater funding mechanisms with examples from three Mid-Atlantic cities.

[Guidance for Municipal Stormwater Funding \(PDF\)](#) (140 pp, 1MB) - Prepared by the National Association of Flood and Stormwater Management Agencies, under Grant provided by the US Environmental Protection Agency, January 2006. This guidance addresses the procedural, legal, and financial aspects of developing viable funding approaches for local stormwater programs. The guidance examines a range of possible approaches to paying for stormwater management, but the focus is on guidelines for developing service/ user/ utility fees to support these programs.

[Financing Stormwater Retrofits in Philadelphia and Beyond](#) - This report developed by NRDC describes Philadelphia's innovative stormwater billing structure and explores how this structure sets the stage for innovative financing mechanisms that can underwrite the capital costs of green infrastructure retrofits.

[Environmental Finance Center at the University of North Carolina \(UNC\)](#) – The Environmental Finance Center (EFC) at UNC reaches local communities through the delivery of interactive applied training programs and technical assistance. The EFC at UNC offers several tools for local stormwater programs, including a stormwater utility dashboard to compare stormwater utility fees in North Carolina, a model stormwater ordinance, and sample trainings.

[Managing Stormwater in Your Community Tool 2: Program and Budget Planning Tool](#) - This spreadsheet tool and accompanying manual developed the Center for Watershed

Protection is designed to assist local stormwater managers with program planning, goal setting, and phasing.

[EPA's Financing Alternatives Comparison Tool \(FACT\)](#) - A financial analysis tool that helps identify the most cost-effective method to fund a wastewater or drinking water management project. This tool produces a comprehensive analysis that compares various financing options for these projects by incorporating financing, regulatory, and other important costs.